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THE CARE OF PREGNANCY*

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I HAVE withstood the temptation which is always before the physician who works in a surgical specialty and shall ask your permission to speak to you upon a subject which may appear to be exceedingly elementary. If excuse be needed for an attempt to emphasize the need for care of the pregnant woman it is abundantly found in the statistics of maternal mortality in this country today. The loss of life in pregnancy and labor is far too great, and it occurs almost altogether among young women, who are at that time of life at which they are of the greatest value to society and to their own families. That most of this loss is preventable is shown by the great variation in the mortality rates which are given for the various states or for large cities, and those which are attained in maternities which are efficiently administered, or by competent obstetricians in private practice. Much of this saving is due to proper choice and skillful use of operative procedures, or, that which may be even more frequently the case, abstinence from unnecessary and meddlesome obstetric surgery. The latter often requires the greater obstetric judgment and experience. To compare average mortality rates for large communities and those for well supervised institutions we may show that the maternal mortality rate for Illinois is approximately 70 per 10,000. The maternal mortality in our hospital obstetric service is 29 per 10,000. Careful prenatal observation and proper obstetrics, then, definitely does show results, as evidenced by the fact that the latter figure is considerably less than one-half the former.

With obstetric surgery this paper has nothing to do, nor can we expect the general practitioner to possess a comprehensive knowledge of the technic of difficult obstetric procedures. We may sometimes wish that, not possessing such knowledge, he would not attempt them. The intelligent care of pregnancy is another matter. One of the three great causes of maternal loss of life is eclampsia. This is almost wholly preventable, or, at least in all but an extremely small number of cases, its approach is recognizable sufficiently far in advance that measures may be instituted to extricate the woman from danger. Our deficiencies in the care of pregnancy have been so far apparent to the public and to law-making bodies as to call forth such an expression as the Sheppard-Towner Bill and to cause its acceptance by most of the states. The remedy for this state of affairs lies very largely in our own hands.

The isolated doctor may protest that he has not at hand all the array of apparatus and personnel which make up the present day laboratory. This is not necessary. For the adequate care of pregnancy, and for the recognition of the largest part of the complications which endanger the pregnant woman, no more is needed than a desire to safeguard her, supplemented by an active intelligence, some degree of professional energy, and such simple items of equipment as a stethoscope, a pelvimeter, a blood pressure instrument, a scale, and a simple office laboratory in which such routine tests of the urine as examination for albumin and sugar, determination of specific gravity and microscopic examination for casts and pus may be carried out. These are all that are used by the obstetric specialist in the great majority of his work. One may even dispense with the microscope if one is not at hand and still afford the woman a high degree of efficiency in observation. More complicated procedures, such as blood chemistry, are used only at times, and, so far as my own experience goes, are of less actual value than clinical judgment, aided by such simple means as have just been mentioned.

It is quite within the power of the average physician to make a general physical examination of the pregnant patient. He would do it for the applicant for insurance whom he might examine. Yet the knowledge of the presence of a heart abnormality, and particularly of any indication of decompensation, may easily mean the difference between life and death. This will not be enlarged upon further than to say that a knowledge of the general physical state of the woman is an essential starting point.

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The presence of foci of infection should be noted and their discovery is as a rule not difficult or time consuming. The teeth, tonsils and sinuses of the skull are the greatest offenders. The woman who harbors infection is more likely to have toxemia, and, I believe, a little more likely to abort by reason of changes in the placenta due to blood borne infection. The relation between foci of infection and abortion has recently been emphasized by Curtis.

I have seen in one of our own cases recent infected infarcts in the placenta from a case of abortion in the first trimester, which under the microscope showed a definite surrounding of the infarct by round cell infiltration. This was apparently a hemogenic infection. The elimination of such foci may make it possible for a woman who has aborted several times to carry a pregnancy to a successful conclusion. Their discovery is usually merely a matter of careful search. It is the common experience of obstetricians that syphilis is an infrequent cause of repeated abortion. We have considered the question of focal infection of sufficient importance in the Pre-Natal Clinic under the management of the Municipality of Evanston to have associated a dentist with the medical attendants, and in our Hospital out-patient department we make frequent demands upon our friends in the Department of Oral Surgery. Most of the things they do for us, however, any well prepared dentist can do and such coöperation is possible in almost any community.

C. H. Davis has recently pointed out the relationship between weight and toxemia of pregnancy. Our own experience confirms this. A gain in weight of twenty to twenty-five pounds is sufficient. Regulation of food intake should be arranged should a more rapid gain than this be made. What is more simple than to weigh the woman at intervals on the scale which nearly every physician's office contains. Yet this precaution is but rarely used. We have often seen a woman who has been toxic in one pregnancy with an abnormal gain in weight, pass through another without toxemia, no further treatment being used than observation of weight and its control by diet regulation.

Simple dietary advice, stressing the importance of limiting the protein intake, and emphasizing the value of vegetables and fruits, together with a daily water intake of two quarts or more should be given every pregnant woman. This will help greatly in alleviating the constipation from which the pregnant woman so often suffers. If these fail, and the addition of mineral oil is not sufficient to give relief, the use of small oil enemata, three to six ounces, at body heat, to be retained from bed time till morning are often of great value. No expensive material is needed, a rectal tube or large catheter with a small metal funnel from the nearest hardware store attached to it, and a supply of any bland oil. A quart container of cheap salad oil from the grocers' is cheaper and serves as well as olive oil from the drug store.

Toxemia is probably the most important complication of pregnancy for which the physician should watch. Routine analysis of urine and taking of blood pressure warns us of it. This should be done every three weeks until the seventh month, every two weeks in the seventh and eighth and weekly during the ninth month. Of these the blood pressure observation is the most important. Some years ago I published the results of blood pressure observations on a series of 447 cases with an average pressure finding of 115 in normal pregnant women. Newell of Boston just before this had published a similar study of 490 cases in which he found the normal pressure to be 114. On the basis of these two series we may assume that the blood pressure in normal pregnancy is a trifle less than that in the non-pregnant state, or certainly, that it is not increased. It is true that cases of eclampsia occur without warning, but it is equally true that these cases are exceedingly uncommon, and can scarcely serve to excuse the appearance of the disease in a woman who has not been afforded the known safeguards against its approach. But one such case has been observed in my experience which now embraces a number of cases sufficiently large to give a very comprehensive view of the field of obstetrics.

The treatment of pre-eclamptic toxemia is simple. Bed rest, elimination and restriction of diet are often successful. While attempts are made to control the toxemia, rigid observation as to its progress should be made. Here again no complicated equipment is needed. Daily or twice daily blood pressure observation is our rule in the hospital and while it may not be possible to have as frequent readings as this in country practice it is not proper to omit it altogether as is too often done. An extra blood pressure instrument will sometimes help as some intelligent member of the family or neighbor may be taught to take the pressure by feeling the radial pulse. A daily urine examination, however, is not so hard to manage as the specimen can be brought to the physician. It should be a twenty-four hour collection as it is essential to know the total output. A daily quantitative albumin estimation is simple and requires only an Esbach tube and a solution of picric acid which can be made by any druggist. The two last named observations are possible in any case. It seems wholly inexcusable today to hear, as I did but recently, of a woman in a town of several thousand, in the middle of a populous and prosperous state, who died of eclampsia, and whose doctor admitted afterward that no blood pressure observations or urine analyses had been made. About a year ago after speaking to a county medical society about two hundred miles from Chicago I was asked by one of the physi-

cians present about a case of eclampsia. Again no precaution of any sort, and pained surprise that he should have been overtaken by such a misfortune. This woman was not miles away in the country but in the doctor's own town. These things should not be, and are nearly completely preventable. In our own maternity, which delivers over seven hundred women per year, eclampsia is so infrequent that we scarcely have adequate opportunity to demonstrate it to our internes. In 1924 in 735 cases, we had two cases of eclampsia. These were both emergency cases, brought in by ambulance, having had no observation. Pre-eclamptic toxemia is, on the contrary, not at all uncommon. This is because most of our immediately contiguous territory, from which emergency work is drawn, is a good residence section of the north end of Chicago and residence suburbs of the North Shore, a district rather comparable to the similarly named district just outside of Boston, although more thickly settled. In these areas we have a considerable number of young well trained physicians. Indeed the careless and indifferent doctor is ordinarily eliminated, intelligent people soon coming to avoid him. Hence most pregnant women are under intelligent supervision, and the results are apparent. I believe most of the difficulties in the way of adequate observation are surmountable. For years in private practice I have had no difficulty in getting patients to come, sometimes for many miles, for observation, and when a rising pressure makes one anxious, and the reason for its necessity is made quite clear, they come sometimes long distances every other day. In a state like Massachusetts, noted for its good roads, and in which automobile statistics would seem to indicate a populace fairly well supplied with the means of travel, few women can be beyond the reach of proper supervision, and the incidence of eclampsia should be low.

The incidence of abortion is admitted by all to be high. It is usually stated that one abortion occurs to every six or seven term pregnancies. Williams states that abortion occurs in one of every five or six pregnancies and believes that this figure would be increased were the very early ones, which ordinarily are not seen, taken into account. Adair, however, whose attention to maternal statistics has probably been as thorough as that of any one in this country, says it is one in three plus. Careful attention to these cases will reduce somewhat these figures. In 1924 there were cared for by myself and my associate, Dr. Charles E. Galloway, 277 private obstetric cases. Our ratio of abortions to term labors in this period was 1 in 8.7. The number of abortions therefore seems somewhat reducible by careful attention.

We know that about one-half of our accidental abortions are due to embryonal defects as has been shown by the work of both Mall and Bartelmez. These we cannot prevent. The remainder are somewhat susceptible to treatment. The woman who has a retrodisplacement, particularly if she has aborted before, should have it corrected in early pregnancy and held in anteposition by a pessary until it is no longer likely to drop backward. Immediate attention to the slightest bleeding is essential. Bed rest until no sign of bleeding has been apparent for forty-eight hours at least and the administration of an opiate are of great value. Vaginal examination should not be done because of the risk of infection and because contact with the cervix may stimulate contractions. One is sometimes surprised at the amount of blood which may be lost without terminating the pregnancy, therefore one need not be too hasty in deciding on surgical interference. Hillis, after tabulating results in a series of 1000 cases of abortion in the Cook County Hospital, Chicago, concludes that only about six per cent of abortions bleed to a dangerous degree, hence every bleeding pregnant uterus need not constitute an indication for immediate operation. Tuttle of the Canal Zone in an analysis of 1164 cases seen in the hospital at Ancon finds that only five per cent bleed sufficiently severely to demand immediate active treatment. In the Frankfort clinic from 1909 to 1920 in a total number of 4000 cases there was no fatal case of bleeding. Hegar in forty years saw no fatal case of bleeding in a pregnancy of under three months.

I must not here go into the treatment of abortion as I am concerned only with its prevention. In addition to care as to activity, dietary deficiencies may play a part. Blair Bell of Liverpool and Reynolds of Boston believe that some cases of repeated abortion are due to a calcium deficiency, an easily correctible error.

The question of retrodisplacement in pregnancy is to some extent associated with that of abortion. Every woman should be examined in early pregnancy to determine whether a retrodisplacement exists, but its discovery does not by an means invariably constitute an indication for treatment. Studies of series of cases have again and again proved that about one woman in five has a retrodisplacement. The majority of these suffer no inconvenience from it. One should note whether the uterus is moveable, and, in case the uterus is large enough for this to be possible, whether any indication of incarceration under the promontory exists. A uterus showing no deviation from normal other than retrodisplacement, and in a woman without history of previous miscarriage, needs no interference. One should, however, as the uterus increases in size, watch it to be sure that it spontaneously rises out of the pelvis. Should this not occur, a manual correction can almost always be done. If it is not at once easily accomplished, one may put the patient in the knee chest position, grasp the cervix with a volsellum

after allowing the vagina to balloon with air, draw downward upon the cervix and make upward pressure upon the fundus either vaginally or rectally. The uterus will almost always be corrected by this maneuver without great difficulty. It should then be retained in ante-position by a pessary until it is too large to assume again the backward position. If the woman has a retrodisplaced uterus as well as a history of miscarriage I believe it is well to correct the backward position as early in pregnancy as possible in order that one possible etiologic factor may be eliminated. And let us hope that the practice, now too current, of assuring women that a retrodisplacement will be cured by a pregnancy, may cease. Pregnancy does not cure it, except during those months during which the uterus is too large to get into the pelvis. Retrodisplacements which were present prior to pregnancy nearly always reappear after labor. The care of these is not within the compass of this paper. One may, however, emphasize the fact that only a minority of women with retrodisplacement really need any active treatment other than the simple attention required during pregnancy and the puerperium.

One other very simple matter engages the attention of the physician. The breasts nearly always at some time are a subject of discussion. I believe they are often harmed by the various applications advised, quite as often by officious friends as by the physician. For years my own practice has been one of extreme simplicity. Tight brassieres are advised against, and, if the breasts be very heavy a support is suggested. These are made by a corsetiere for such women as require them but there is nothing about them which would tax the skill of a village dressmaker.

The use of so-called hardening lotions of tannic acid, alum solutions, and the like upon the nipples for the purpose of making them more resistant to the trauma of nursing is a perfectly useless and often harmful practice. These drugs are irritating to the skin, and instead of toughening it, they merely produce a feeling of hardness due to their astringent action, a condition which favors cracking of the skin far more than it prevents it. Again the use of grease or oil of one or another sort to increase pliability is of little value. Less harmful than the astringents, they still tend to clog the pores of the skin and the orifices of the milk ducts which are often discharging.

I have used none of these for many years. The woman is told as soon as any visible discharge appears, and at the beginning of the ninth month in any event, to cleanse the nipples daily with some bland soap, such as castile or Ivory, washing them gently to remove any crusts, and then to dry them gently with a soft cloth. This removes any secretion which may have lodged upon the nipple, and which may decompose as any animal secretion will, and perhaps be a cause of a local dermatitis which will render the nipple less resistant. If we can fix firmly in our minds the fact that we cannot alter the skin which nature has been pleased to give the woman, and that such as it is she must get on with it, but that by simple, sane hygiene we may put the nipple in condition to exert such resistance as it has, the rationale of this will be apparent. Vigorous rubbing with rough cloths or brushes for the purpose of toughening is to be condemned.

One of our daily tasks is that of advising with the woman in early pregnancy who is vomiting. This is so frequent an annoyance that the obstetrician must be on his guard lest, wearied by the frequent hearing of this complaint, he may fail to give adequate attention to some woman who needs it. Simple means may sometimes suffice to give some comfort to a woman who is made very uncomfortable. We must be on guard on the one hand lest exaggeration of symptoms by the woman who desires to be rid of an unwelcome pregnancy may cause us to believe we are dealing with a condition of danger, and on the other lest too casual an attitude on our part may cause us to fail to recognize a severely toxic type of vomiting. The latter error is the less common, yet in consultation I have seen it a few times, in two of which the women were so gravely toxic that death followed in spite of prompt emptying of the uterus. Study of the blood chemistry is of some value in differentiating these cases, but I assume that not all members of this society are so placed as to have daily access to a laboratory capable of making studies of this sort. One may get on quite well without them. The woman who after persistent vomiting, begins to show an acceleration of pulse rate, a sub-icteric tint to the skin, a slight albuminuria and possibly a trace of fever is providing the practitioner with an abundance of clinical warning that the condition is not a safe one. Williams warning that it is better to interfere a little too soon rather than too late is a wise one. Where chemical blood studies are available it will be found that in nearly all of the serious cases of toxemia of early pregnancy an increase of uric acid in the blood is found. This is by all means the most significant factor in the blood chemistry. In a large number of observations we have found this to be true in nearly every case. The normal uric acid content, which should be in the neighborhood of 1.5 mgms. per 100 c.c. of blood will rise materially. Our highest observation was 6 mgms. per 100 c.c. One which was very recently cared for, and upon whom a therapeutic abortion was done, showed a uric acid content of 4.5 mgms. As hospitals increase in number and effectiveness, facilities for observations of this sort become available to an increasing number of practitioners. In our own service we have had a

large number of cases studied with a view to obtaining some idea of the value of blood chemistry. These have been carried out by our pathologist, Dr. J. Lisle Williams, who has himself published reports of his work. We have found practically always that the gravely toxic cases showed an increase of blood uric acid, this being the only significant finding. The amount of the increase over normal does not always seem to be proportionate to the clinical evidences of toxemia. Several women who appeared gravely ill had only a moderate increase, while the woman alluded to above, who had a uric acid content of 6 mgms. was carried through her pregnancy although with some difficulty. The presence of an increase in blood uric acid should be looked upon as a valuable indication of the presence of toxemia, although not always as providing a true measure of its severity. I believe very strongly that this is one of the situations in which the physician should make thorough use of the laboratory while at the same time cultivating to the full his ability for clinical observation. In these days of ultra-scientific medicine, the latter is sometimes not accorded the very important position it should always have.

The less serious and far more common vomiting of early pregnancy is more easily managed. Usually the advice to take five or six small meals daily, instead of the usual three, will help. Dry foods should be preferred, bread, crackers, toast, cooked vegetables, cereals, stewed fruits are retained more easily than fluids. The woman should be encouraged to resist the desire to vomit. It is far easier to acquire a vomiting habit than to get over it. Drugs are of little value. Sodium Bromide and sodium bicarbonate help some women. Others are benefited by injections of corpus luteum, although I am not convinced that the results are not often due to suggestion. When severe vomiting persists it is far better to get the woman away from anxious relatives whose constant solicitude and inquiries as to her desire to eat or her ability to retain this or that form of food are far from helpful. She will usually do better in a hospital. Relatives may be kept away. The nurses are cautioned to refrain from mentioning vomiting or food and to manifest at all times an entire confidence in the outcome. No basins are allowed in the room. A basin may suggest that she is expected to use it. An ice bag over the epigastrium seems at times to help. She is given a cleansing enema and thereafter every four hours a retention enema of 180 c.c. of water containing 10% of glucose, 5% of sodium bicarbonate and Gm. 1 of sodium bromide. This is continued for twenty-four to forty-eight hours, the bromide being diminished if she becomes sleepy.

Mouth feeding is then begun, giving cream and milk, 30 c.c. each, every two hours. This is increased to 45 c.c. each the next day, in another day to 60 c.c. Further increases on subsequent days if possible and as soon as possible water or fruit juice may be given between milk feedings. Frequently after four or five days other foods may be substituted, or toast and egg for one of the milk feedings, mashed potato for another and so on. When this point has been reached further progress is generally easy. The physician must be something of a psychotherapist for many of these women must be held up and encouraged constantly. It is not wise to discuss the likelihood of terminating the pregnancy, for in cases other than the severely toxic ones it is rarely necessary, and some women, if this alternative seems possible, are less apt to strive to improve. These measures have been used in a large number of cases and with a considerable measure of success. A number of cases which were sent in by physicians for therapeutic abortion have been carried through successfully.

I have tried to indicate, very briefly and imperfectly, some of the things which years of work in gynecology and obstetrics have shown me to be of practical importance, and which must be considered daily by any one who is responsible for a considerable number of pregnant women. There is no field of work in which the physician may engage in which careful painstaking effort will yield a greater measure of actual tangible results. So long as the people feel that pregnancy and labor need no especial attention, and so long as we physicians feel that obstetric cases are a troublesome portion of our work, the burden of which is to be evaded as much as possible, so long will American mortality statistics compare poorly with those of some other countries. If the physician can feel a real interest in this work, much of this will disappear. It may be difficult to convince some men that the care of the pregnant woman and her unborn child, and the safe conduct of them both through labor is an intensely interesting work. Further, the man engaged in it may feel that he is doing something very definitely worth while and which, properly done, will pay him a definite reward of satisfaction.

Discussion

Dr. Thomas Almy, Fall River: The paper gives so little room for discussion that it might well be a text-book for any physician doing obstetrics to keep on his desk and read once in a while. It seems to me that the value of prenatal care is thoroughly established. The physicians have become well educated to its value—whether they practise it or not is another thing. The effect upon babies is something that is worth considering, because after all the prenatal care should begin with the care of the newborn babies, both the potential fathers and mothers. In the Municipal Clinic which were established in

Fall River two years ago we found some interesting statistics as regards babies. We started in one small section of the city and did intensive nursing prenatal care, including blood pressures and urine examinations, and where the physicians who were to deliver these cases would allow us, these patients were examined in the Clinic. We had in twelve months 265 cases, and in the same district there were 303 cases that were not supervised. The results of these cases that we checked up showed of the supervised cases a still-birth percent of one half (0.5), and dying within the first month a one and one tenth (1.1) percent and among the unsupervised cases we had five (5) percent still-born and six (6) percent dying within the first month of life. So from the standpoint of the babies prenatal care has proved itself of value.

We are going on now and supplying nurses—the city is supplying nurses to aid in the delivery of patients; and they carry with them a sterile kit. We think this is a good thing not only for the mothers but also in educating the doctors. We find that some of the doctors are not so prone to deliver their cases by operations.

The two menaces in a city with a large foreign born population are that we find doctors who deliver few cases delivering by operations and midwives who use pituitrin indiscriminately. I had one woman exsanguinated from a tear after the use of pituitrin by a midwife and another, a multipara, with a dead baby high above the brim which necessitated craniotomy, and we thought this woman had a ruptured uterus, but fortunately she recovered.

Dr. Edwin R. Fleming, Medford: In regard to the cases of pre-eclamptic toxemia my experience has been that we are apt to carry them too far with the hope of getting a viable baby. In carrying them along you seldom gain anything, the fetus dies of the toxemia and we do irreparable damage to the patient's kidneys. I had the opportunity of seeing just such a case within the past few weeks. This patient, who was very ill, had been tided along with the idea of getting a viable child. When I first saw her she was talking incoherently, was practically blind, marked edema, blood pressure 185-145, catheter specimen of urine boiled solid but fortunately for all concerned she was in active labor. She expelled a macerated fetus, had two convulsions but fortunately by active treatment she recovered.

I was very much interested in Dr. Danforth's statistics. A maternal mortality of seven per one thousand deliveries for the state as a whole and three per one thousand in a well conducted maternity hospital. Less than one half. This is instructive because it shows what careful watching of our obstetrical patients will do. To record a personal experience I might say of three thousand private cases I have had a maternal mortality of four, one of these I believe should have been prevented.

Focal infections I believe are a more common cause of abortion than we realize. Many of the cases we see, especially the early ones, have bad teeth, infected tonsils, or sinus trouble. Every patient is advised to have their teeth inspected two or three times during her pregnancy. If there is any suspicion of nose or throat trouble they are referred to a nose and throat man.

The doctor did not mention pyelitis as a complication of pregnancy. I believe this to be more common than we generally suspect. A unilateral backache or a trace of albumen may be due to a pyelitis and should be watched for in all pregnant patients. A catheter specimen and a few minutes with the microscope will clear the diagnosis.

A rapid gain of weight should always be looked upon with suspicion. It is frequently a beginning edema. We have not given this matter enough of attention. The doctor said "a gain of twenty-five pounds is not abnormal." I believe that is the limit of safety. A para one came to my office lately and said she had gained thirty pounds in less than four months. She was twenty-three years old showed no external signs of edema, B. P. 120/80 urine negative. I had her return in a few days for observation. B. P. had risen to 150/110 urine loaded with albumen. If I had paid no attention to the gain in weight, that patient in all probability would have had convulsions before I should have seen her again.

Speaking of blood pressure, I had an opportunity to follow up a series of cases. Practically all normal cases showed a decline in pressure of five to ten points.

In regard to the breasts—the doctor did not mention inverted nipples. This is one of the minor things that has given us much worry and the patient much unhappiness. I have found a great deal can be done for these cases. I tried to lift them out with the ordinary breast pump but it is so large it would pull out the areola but not the nipple. I took an ordinary test tube of medium size and heated it over a Bunson burner and drew it out so the lower end would fit into the rubber bulb of the breast pump. This tube will fit snugly over the nipple. By beginning to make gentle traction of the nipple every few days from the fifth or sixth month on, my efforts were frequently rewarded with success. I have recently had one patient who could not nurse her first two babies on account of inverted nipples who at present is nursing her third baby with complete success.

The early toxemies of pregnancy where there is much vomiting has given us much concern. Where the simple measures have failed luminal sodium in small doses a half hour before meals has been of signal benefit in many cases. This is another class of patients with which we should be very careful less we try palliviate treatment

too long and our patient suddenly goes into a state of exhaustiton and recourse to operative treatment is frequently fatal. It is better to sacrifice an embryo than the mother.

DR. FREDERICK L. GOOD, BOSTON: At the start I want to compliment Dr. Danforth for his very thorough and pains-taking paper. Dr. Almy truthfully said that Dr. Danforth's paper was so thorough, so complete, that it makes it rather hard for anybody to discuss his paper in a constructive manner. I would like to enlarge on a few things that Dr. Danforth said. First, his reference to foci of infection. During the past four or five years I have seen three or four fairly severe cases of pyelitis that wouldn't yield to treatment and which almost immediately cleared up after the extraction of two or three pussy teeth. I think that demonstrates how important the question of focal infection is insofar as pregnancy is concerned.

As to miscarriages—whereas, there is no doubt in my mind but that a very large number of miscarriages are due to defects on the part of the fetus, I also feel that the question of periodicity, so-called, enters into the question of miscarriage. Many times I have been notified by patients that they have met with trivial accidents and that they were fearful lest they might miscarry. I can recall but three patients miscarrying or having a premature birth as the result of trauma and those three patients had their premature birth at about the time they would have been unwell were they not pregnant. That, then, is what I mean by periodicity. I feel that we should imprpess upon our patients the absolute necessity of doing things a little bit different at the time they would be unwell were they not pregnant.

As to the toxemias—the toxemias of early pregnancy—I can add very little, if anything, to what Dr. Danforth has already said. There was a time when I felt pretty much the same as Dr. Danforth feels about the value of corpus luteum. A few years ago, however, I succeeded in having made for me an extract of placenta, amnion and chorion—an extract of human placenta. I treated many cases with this extract and also gave it to certain friends in order that they too might treat their cases. I think I can truthfully say that 14 out of 15 cases showed immediate signs of improvement. That convinced me that in all probability we were dealing with something that might well be described as an endocrine disturbance. Whereas, I have not obtained as good results with corpus luteum as with the extract of human placenta, amnion and chorion, I feel that the good that comes from the use of corpus luteum comes from its use on that endocrine theory.

As for the late toxemias, the pre-eclamptic toxemias—Dr. Danforth said that physicians didn't know all they might know about blood chemistry. I will be more frank that Dr. Danforth and say that I, one obstetrician, know very little about blood chemistry but am nevertheless vitally interested in that subject. I have had two patients within the past year and I feel that the successful termination of both of those cases was due to the results of blood chemistry; one, a primipara with a systolic blood pressure of 110, a large amount of albumin, no toxic signs or symptoms—other than the presence of the albumin. I at first thought that possibly I was dealing with a case of pyelitis. At the end of my office hour, however, when the sediment of that urine was examined microscopically, I was surprised to find a large number of casts and renal cells. That leads me to mention here that, whereas, in the vast majority of cases the taking of the blood pressure and the chemical examination of the urine may suffice, that there comes that occasional case where one may be completely fooled unless he examines the sediment. The other patient was a multipara who had been delivered three previous times of premature dead babies. Once, twice, she delivered herself prematurely spontaneously. The third time she was threatened with convulsions, and the diagnosis of toxemia of pregnancy had been made. I saw the patient in the early months of her pregnancy at which time she had a systolic pressure that varied from day to day or from morning to night from 185 to 240. I had Dr. James O'Hare of the Peter Bent Brigham Hospital see this patient in consultation, and it was he who did the blood chemistry work. Dr. O'Hare quickly arrived at the conclusion that we were dealing with a chronic interstitial nephritis and not with a true toxemia of pregnancy. He wisely advised leaving the patient alone, that is, insofar as interruption was concerned. Following out his line of treatment and incidentally—iconoclastic as it may seem to many here—giving that patient a large protein intake daily, we were able to carry her on to her ninth month at which time she fell into labor and was delivered of a live baby by an easy low forceps delivery. The baby I am glad to say is still alive.

Now, fellow members of the Massachusetts Medical Society, I have already said that I know little, if anything, of blood chemistry. You will pardon me then if I say that, I have read enough on the subject to be completely at sea. Whereas, Dr. Danforth in speaking of uric acid in the blood in the early months of pregnancy (in the early toxemias with nausea and vomiting). I think there are those blood chemists who today say that the prpesence of uric acid in the blood should make one strongly suspicious of a chronic interstitial nephritis rather than of a toxemia. I think there are a few who look upon that as being almost pathognomonic of chronic interstitial nephritis. I think that when we have cases showing a depressed renal function with an increase in urea nitrogen or non-protein urea that we should give serious thought to the question of whether or not we are dealing with a

chronic interstitial nephrits or with a true toxemia of pregnancy. Personally, I feel that if we are dealing with a case of chronic interstitial nephritis rather than a toxemia, there is far more likeklihood of our successfully terminating that case.

In conclusion, let me say to Dr. Danforth and to those few here who may not be fully cognizant of the work that is being done in order that we may overcome our relatively high fetal and maternal mortality, that our Section of Obstetrics under the able leadership of Dr. Mongan and Dr. Irving, our BOSTON MEDICAL AND SURGICAL JOURNAL, our State Board of Health, our city and town boards of health, our medical schools, our five largest obstetrical clinics in Boston, the Booth, the Boston City, the Boston Lying-In, the Carney, and St. Elizabeth, are all carrying on and are showing wonderful progress.

FOSTER S. KELLOGG, BOSTON: When this work was started by the appointment of this committee last June, the committee got to work very slowly and this year's work does not show much, and must be considered in the light of a preliminary study. The detailed report read yesterday was on 200 cases which the committee collected belonging to the "Toxemic-Chronic Nephritic Group." Before ever this work is of any value, we must have 1000 cases for study. If we can get the coöperation of the members of this Society doing obstetrics to the extent of five to ten cases each with well kept records, we can make up 1000 cases the coming year from hospital records. The Chairman of the Section has worked out a system which will make this possible providing enough members of the Society are interested and will help. Dr. Mongan said that we were studying the recurrent toxemias, but it is a fact that we must collect not only recurrent toxemias but acute toxemias and chronic kidney cases complicating pregnancy in order to classify the recurrent toxemia cases correctly.

The results of our studies this year may be summarized in a few conclusions. First, that the records, including our own, are bad, and that they must be improved, particularly in regard to follow up observation. Second, that the maternal mortality in toxemias without convulsions is very small, whereas the maternal mortality in cases having convulsions in the group studied is 50%; therefore, it seems permissible to draw the further conclusion that the way to reduce the higher mortality from toxemia of pregnancy with convulsions is to deliver them before they have convulsions. Third, that the rate of recurrent toxemias is at present 7% of all "Toxemic-Chronic Nephritic Group" cases, —15% of the multiparae studied in this group.

JOINT FRACTURES*

BY PHILIP D. WILSON, M.D., BOSTON

IN considering various fracture topics to bring before you it seemed wise to limit the discussion to a class of fractures which has always constituted a particularly difficult problem from the standpoint of treatment, namely, joint fractures. It is intended to include under this designation all fractures occuring in the region of a joint, whether intra- or extra-articular. That fractures in or about joints give rise to long periods of disability and that they are often followed by more or less permanent crippling is common knowledge. That the treatment is

TABLE 1

DISABILITY RECORD FOR JOINT FRACTURES
PERIOD JULY 1, 1921 — JUNE 30, 1924

Region		Ankle		Elbow	Shoulder	Wrist		Hip	Knee	
		One	Both			One	Both		One	Both
Total fractures		558	5	139	377	802	9	69	146	1
Deaths		3	—	—	1	1	—	3	2	—
Permanent total disability		—	—	—	—	—	—	—	—	—
Permanent partial disability		6	—	—	2	—	—	3	1	—
Temporary total disability		549	5	139	374	801	9	63	143	1
		Duration of Total Disability								
	Average									
1- 7 days	½ week	11	—	6	17	34	—	7	6	—
1- 2 weeks	1½ weeks	7	—	7	25	32	—	6	8	—
2- 4 weeks	3 weeks	42	—	25	51	85	—	1	15	—
4- 8 weeks	6 weeks	124	—	38	107	340	—	8	27	—
8-13 weeks	11 weeks	174	1	28	82	200	2	6	19	—
13-26 weeks	20 weeks	149	2	22	60	96	4	13	41	—
26-52 weeks	40 weeks	41	2	11	31	13	2	22	25	1
Over 1 year	78 weeks	1	—	2	1	1	1	—	2	—
Average disability (weeks)		13.6	28.4	11.9	16.7	9	28.8	20.1	16.4	40

*Read before the Massachusetts Medical Society at its annual meeting, in Boston, June 9, 1925.

often unsatisfactory or inadequate is also apparent and is borne out by the great lack of uniformity in the results obtained in given types of fracture.

STUDY OF DISABILITY FIGURES IN JOINT FRACTURES

Disability figures for fractures involving the different joint regions have been obtained from the Industrial Board of one of the States, and are shown in Table 1.

These figures are, doubtless, based upon the reports of the attending physicians, and there is probably much inaccuracy in the diagnoses. This is suggested by the considerable number of cases with a total disability period of less than two weeks, including 13 cases of supposed fractures of the hip. It will be noticed that there is no record during the three-year period of any award of permanent total disability in these injuries, nor would such be expected except in complicated cases which probably are not included in the table. There were only 12 awards of permanent partial disability, a figure which is astonishingly small in a total of 2,156 joint fractures, and the explanation for which is probably to be found in a difference in the methods of classification. Ten of the 12 cases of permanent partial disability were fractures involving the joints of the lower extremity, a point to bear in mind. Similarly the average disability periods were longest in fractures of the hip, knee and ankle, all weight-bearing joints. The only fractures of the upper extremity which equalled these in duration of disability were those of the elbow, which confirms the general notion of the severity of these injuries. Double fractures nearly doubled the disability period. No figures are available to show the

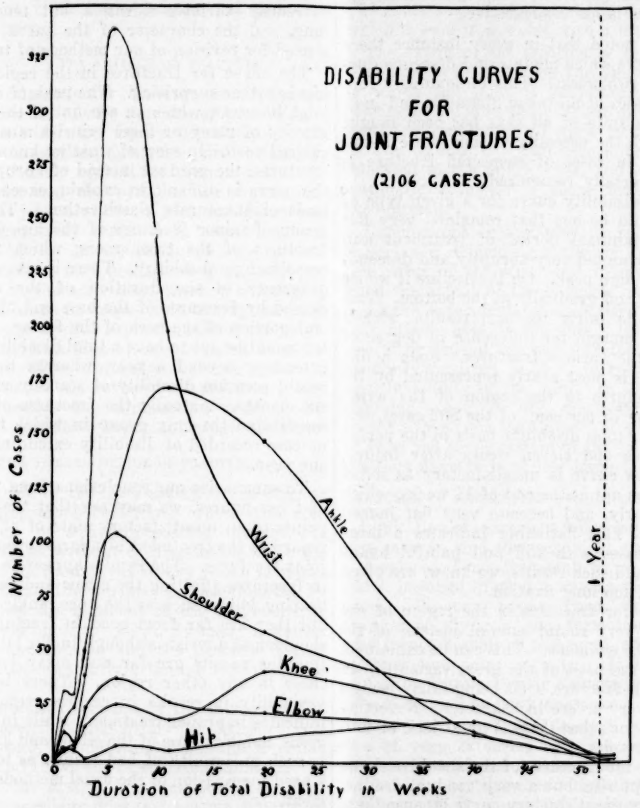


CHART 2.

duration of the period of temporary partial disability, which always follows and sometimes exceeds the period of total disability.

Average disability figures are of little significance, however, when dealing with as many different types of fractures as must necessarily be included under these general headings. Curves have therefore been constructed with these figures as a basis (Chart 2). Study of these disability curves is quite suggestive.

It will be noted that in every instance there is a small curve which mounts and descends during the first two weeks. This undoubtedly represents the cases of mistaken diagnosis and indicates that in spite of all that has been taught and preached, the necessity of immediate X-ray examination in cases of suspected fracture is not yet universally recognized.

The ideal disability curve for a given type of fracture would be one that remained very flat during the minimal period of treatment and which then mounted very abruptly and descended, leaving a high peak. On the decline it would perhaps taper off gradually at the bottom. This would indicate fairly uniform results, with a considerable margin for difference in degree of severity of the various fractures. Such a disability curve is most nearly represented by the one for fractures in the region of the wrist, where 605, or 75 per cent. of the 802 cases, terminated their total disability basis in the period between three and eleven weeks after injury. But even this curve is unsatisfactory as it begins to flatten out at the end of 14 weeks, which is far too early, and becomes very flat indeed at its end. This flattening indicates a large number of cases with stiff and painful hands and wrists, and such results, we know, are often the result of too long fixation.

The curve for fractures in the region of the ankle has a very round summit instead of the ideal peak-like eminence. This can be explained, perhaps, on the basis of the great variability in types of ankle fracture, some being fairly benign and others very severe in character. Nevertheless, it is obvious that there is great lack of uniformity in results.

The curve for fractures of the shoulder shows a very abrupt rise, but a very gradual decline. This is a very unsatisfactory curve because there is not enough variation in the common fractures of this region to explain it. Joint stiffness seems to be the only explanation of such great difference in results, and this, we know, is largely preventable.

The curves for fractures of the knee and elbow are the most unsatisfactory of all. The former is a flat curve with two summits, which obviously indicates two different classes of injury. The first extends through a period of eleven weeks and represents probably the minor injuries of the knee, including sprains, internal derangements and minor fractures. This is followed by a second rising curve with a slow decline and this is produced, doubtless, by the more severe types of fracture, but here again there is indicated a complete lack of uniformity in results and prolonged disability. The curve for fractures of the elbow can scarcely be called a curve at all. It is the most unsatisfactory of all on account of its plateau-like character. Disability caused by such injuries is obviously of extremely variable duration but tends to be long, and the character of the curve indicates a need for revision of our methods of treatment.

The curve for fractures in the region of the hip is rather surprising. The peak of disability is at 40 weeks, which on account of the extreme gravity of many of these injuries must be considered good. In view of what we know of these fractures, the gradual instead of abrupt rise of the curve is difficult to explain, except upon a basis of inaccurate classification. There is a group of minor fractures of the hip, including fractures of the trochanters, which need not occasion long disability. There is also a marked difference in the duration of the disability caused by fractures of the base and of the central portion of the neck of the femur. The latter would be apt to have a total disability period extending beyond a year, whereas the former would occasion disability of scarcely more than six months. Actually the fractures of the hip constituted the only group in which there was no case recorded of disability extending beyond one year.

To summarize our conclusions from the study of these figures, we may say that the evidence points to an unsatisfactory state of affairs with regard to the treatment of a large proportion of joint fractures. The results appear to be worse in fractures affecting the elbow and the weight-bearing joints, such as the knee, ankle, and hip, but they are far from good in fractures of the shoulder and wrist, although in the latter situation the results are far and away better than those in any other region. There is extreme variability in results in certain regions which indicates improper treatment, while in other regions, notably those of the elbow and knee, there is such uniformity of bad results as to indicate a need for revision of the usual methods of treatment.

TYPES OF JOINT FRACTURE

Before proceeding to a discussion of the treatment of these injuries, let us first consider the differences between certain types of joint fracture and the special potentialities of each for harm. Primarily we must distinguish between juxta-articular and intra-articular fractures. The former are situated in close relation to the joint, but do not involve the articular surfaces. The term intra-articular may be applied to any fracture which penetrates into a joint, but for the purpose of our discussion we will use it to

designate a fracture which enters the joint by passing through the articular cartilage. As a matter of fact, many of the juxta-articular fractures which are commonly regarded as extra-articular do actually penetrate into the joint through a synovial prolongation or pouch, but such involvement is rarely of great significance and the distinction between the two types is of importance from the standpoint of prognosis and treatment.

THE JUXTA-ARTICULAR FRACTURE

The juxta-articular fracture is of menace chiefly because of the damage to periarticular structures which the injury occasions and the extensive exudation about the joint which may follow. During repair the torn muscles and soft tissues and the periarticular haematoma are invaded by fibro-blasts and osteogenic cells and are gradually replaced by scar tissue and callus. All layers are cemented together and joint movement may be limited or entirely prevented. At the same time there is a tendency for the callus to be excessive in amount and this may impinge against a prominence of the neighboring bone and thus block movement at a certain point. These processes vary in extent in direct ratio to the severity of the injury and hence extensive comminution or marked displacement constitute important prognostic signs.

THE INTRA-ARTICULAR FRACTURE

In the case of the intra-articular fracture we must distinguish between two types. One consists merely of a fissure passing through the joint cartilage without displacement, while the second, in addition to the injury which it causes to the articulating surface, is accompanied by more or less displacement of the fragments or by a dislocation of the joint. In many instances there is comminution and the problem is that of the juxta- and intra-articular fracture combined.

The significant features of the intra-articular fracture are, first, the injury to the joint cartilage; second, the deformation of the articular surface; and third, the ligamentous damage. In respect to the first, it is a well-established fact that joint cartilage does not possess reparative power. The defect of a fissure fracture is filled by the upgrowth of granulation tissue from the marrow spaces of the bone, and this is transformed ultimately into fibrous tissue. A defect always remains in the joint cartilage and in later years this may provide the starting point for degenerative changes involving the cartilage which may spread to a wide area of the joint surface.

Distortion of the joint surface caused by the displacement of one or more fragments is a still more serious matter. The ability of a joint to function depends upon the smooth, even adaptation of the contour of one surface to that of its fellow. Nature seems to abhor an incongruence of articular outline, as has been pointed out by Preiser. Unless the configuration of the joint can be completely restored excessive wear and tear result, an inflammatory reaction is set up and a traumatic arthritis develops which progresses slowly with pain, weakness and limitation of motion as its external manifestations. The process is akin to the purely mechanical one which is seen in a wheel with a broken bearing.

The extent of the reaction is dependent to a considerable degree upon the amount of strain to which the joint is subjected. As weight-bearing constitutes the heaviest duty which any joint is normally called upon to perform, it is natural to find that joint deformity is least well tolerated in the ankle, knee, and hip, and that traumatic arthritis is there most frequently encountered.

Ligamentous injury may or may not be of importance, depending naturally upon the relative value of the structures involved and also upon the extent of the damage. Certain joints are more dependent upon ligamentous support than others, notably the knee. Rupture of the lateral or crucial ligaments of the knee, unless promptly repaired, is likely to result in permanent instability of the joint. In the case of the shoulder, elbow, or hip, much stability is obtained either from the support of strong muscles or from the configuration of the joint, and ligamentous damage is of less importance.

CAUSES OF LIMITATION OF JOINT MOVEMENT

Limitation of movement following a joint fracture may be due to mechanical causes such as a displaced bone fragment or a large callus which impinge in such a way as to block movement. It may result from extra-articular changes, chiefly scar tissue formation and callus, with firm adhesion of the surrounding muscles, tendons, and joint capsule. It may also be caused by intra-articular damage with some degree of fibrous or bony ankylosis.

True bony ankylosis is likely to occur only in case of very extensive bony damage in which both joint surfaces are involved. So long as the articular cartilage remains intact on one side of the joint it constitutes a barrier through which the bone-forming cells cannot penetrate and thus prevents. When dislocation of some degree accompanies the fracture the situation is different. Here there is stripping up of capsule and periosteum on both sides of the joint with the formation of an extensive haematoma and liberation of osteogenic cells. Fusion may not occur through the intact cartilage, but it may take place around the joint, as is seen in many elbow injuries in children where there results a typical myositis ossificans with complete ankylosis.

Fibrous ankylosis considered in the sense of intra-articular fibrous adhesion likewise occurs

only when there has been considerable damage to both articular surfaces, sufficient to allow the ingrowth of pannus either from the synovial margin or from the point of the defect. It is a rare result of itself but may represent an early stage of what later becomes a true bony ankylosis. The condition which is called a fibrous ankylosis is generally an extra-articular cementing together of muscles and callus, such as is seen not infrequently in the knee following a fracture of the shaft of the femur. In such a case the joint remains entirely normal and movement can be restored by lengthening the adherent structure, which in the case of a fractured femur is usually the quadriceps tendon.

This consideration of pathological and reparative processes is intended to show that the victim of a joint fracture is exposed to two dangers. The immediate risk is that he may never completely recover joint function. The other danger is more remote and for that reason is frequently lost from view. The patient who, following a long period of disability, finally recovers a useful range of joint movement, may after a time find that pain reappears and increases and that function tends to diminish, due to the gradual progress of a traumatic arthritis. The treatment of a joint fracture must be planned in the light of both these dangers, and with the view to preventing and removing their underlying causes.

TREATMENT OF JOINT FRACTURES WITHOUT DISPLACEMENT

The joint fracture without displacement, whether intra- or extra-articular in situation, represents in general a very unimportant type of injury. The prognosis is good and the disability should be of minimal duration. There is more danger from over-treatment than from under-treatment. The guiding principle is protection and early movement. In the upper extremity this usually means a bandage and sling, or a light splint. In the lower extremity it means, above all, relief from weight bearing, usually by means of crutches, with light protective splinting when there is definite indication. The joint may be moved immediately, without danger, so long as the movement is executed by the patient's own muscles. The only bar to movement is pain, and this quickly subsides as the effusion disappears. The dressings should be removed daily to permit massage and movement. Pain is the warning sign and indicates that the limit of toleration for movement is being exceeded. Splinting, when needed, is rarely required for more than two to four weeks, but some restriction of use is necessary for a longer period. In fractures of the lower limb, weight bearing must be avoided until healing is complete, a matter of four to eight weeks, depending on the location of the injury. This is of special importance and in case of doubt one should lean to the side of safety. If a Thomas caliper brace can be applied which relieves the limb of a part of the body weight, active use may be permitted at an early date. This unfortunately necessitates the services of an expert brace maker, which are not always available.

TREATMENT OF JOINT FRACTURES WITH DEFORMITY

While the treatment of the joint fracture without displacement is in most instances a simple matter, it is far different when we turn to the joint fracture with deformity. Here the problem is exceedingly complex and the way may be beset with difficulties of a nature to test the skill of the most able surgeon. Different methods of treatment are usually available and the most suitable one must be selected. This demands a correct appraisal of the different anatomical and mechanical features of the injury and requires the exercise of the very best surgical judgment. In a good many cases the damage is so extensive as to quite exceed the possibilities of surgical repair, and here it is a question of how to obtain the greatest possible restoration of function.

These considerations are important because with the odds so much against us on account of the nature of the injury we must correspondingly fortify our own position by insisting that the best modern facilities for treatment be made available. I take it as generally conceded that cases of severe joint injury must be treated in a hospital where complete equipment for fracture treatment is available, including the standard fracture apparatus recommended by the Fracture Committee of the American College of Surgeons, overhead suspension frames, facilities for fluoroscopic reduction of fractures, a portable Roentgen outfit, and an operating room with a thoroughly trustworthy aseptic technic. This is fundamental.

What are to be the general principles of treatment? First, accurate reduction and reposition of the fragments. Displacement which would appear insignificant if located elsewhere assumes entirely different proportions when the injury involves the articular surfaces. This rigorous standard is necessary in order to avoid the disastrous results of articular incongruence and to prevent excess callus formation. While correction of deformity is essential in all joint fractures it is doubly so in injuries affecting the weight-bearing joints of the lower limb. Second, and equally as important as the first, of which it forms the necessary corollary, is early movement and avoidance of prolonged fixation. Only by this means can the disability which results from extra-articular causes be reduced. Early movement hastens the absorption of exudate, prevents the fixation of muscles and tendons by scar tissue and callus, maintains nutrition, prevents muscle wasting and insures that the patient will be left with no further handicap than

that directly resulting from the bony and cartilaginous damage. These two principles constitute the guiding rules of our therapeutic program and we must follow them wherever they lead and must overcome, in so far as possible, all obstacles which lie in the way of their realization.

CLOSED REDUCTION

Open operative procedures are required in many instances to secure the meticulous apposition of fragments which is necessary for perfect joint function. This applies with particular force to the intra-articular type of fracture, and especially to the notoriously disabling fractures of the elbow and knee. On the other hand, there are many joint fractures which yield to closed methods of treatment. These include most of the juxta-articular fractures and the majority of the intra-articular fractures of the wrist and ankle. Closed reduction, when indicated, should be performed at the earliest possible moment and with the aid of the fluoroscope in order to have the greatest chance of success. The recently perfected oil immersed tube in combination with the fracture table represents a distinct forward step in rendering this procedure easier and safer. The manipulation should be carried out with the minimum of trauma and should not be unduly prolonged. If, after brief trial, success is not attained, the attempt should be given up and recourse should be had to open operative measures. When closed reduction is successful the position of the fragments with the splints in situ must be checked by X-ray examination. Information should be obtained at the earliest possible moment of the success or failure of such methods in order that open reduction, if needed, may be employed without delay.

OPEN REDUCTION

When open operation is indicated, the procedure must be carefully planned with a view to the needs of the particular case. The incision must be placed so as to give the greatest exposure with the minimal amount of trauma to the joint structures. There have been many cases where this rule has been neglected and where although the immediate object of the operation has been attained, the end result has not been good because of the stiffness resulting from the operative damage. Gentleness and respect for anatomic structures should be the rule. The most scrupulous aseptic technic should be observed as this is the only way in which the risk of infection can be minimized. The fragments should be freed and approximated with as little stripping away of soft parts as is possible in order not to imperil their blood supply. Complete restoration of the articular contour should be brought about when possible. A last step before closure consists in trying the effect of different joint positions upon the stability of the fragments in order to find out how best to maintain alignment.

Some form of internal fixation must often be employed in the operated cases. This is desirable not alone for the purpose of preventing recurrence of the deformity, but also because it permits early movement of the joint with safety. The method to be employed varies with the nature and location of the injury. Whenever possible the choice should be made in favor of absorbable materials such as chromic catgut, kangaroo tendon, living suture of fascia, pegs or screws of beef bone or ivory, but on occasion, metal wire, pins, screws, bolts or plates must be used. The great disadvantage of metallic fixation lies in the fact that a later operation to remove the foreign body is usually required, since it is generally agreed that its continued presence may do harm.

Folowing reduction, either by the closed or open method, some form of external fixation is necessary. Extension in combination with the Thomas integral traction splints and suspension from an overhead frame are the methods to be used whenever possible. These permit exposure of the injured part and provision can be made for early mobilization of the damaged joint. In certain situations, such as the wrist and ankle, plaster of Paris splints best meet the need. My own preference is for splints rather than circular casings, but there can be no objection to the latter if they are split on two sides as soon as they have hardened. Splinting must always be planned with a view to early movement.

EARLY MOBILIZATION

By early movement I do not mean that mobilization is to be begun in all instances the day following reduction. This is manifestly impossible in many cases—such, for example, as a fracture of the neck of the femur. With many injuries in other situations it would be unwise, as the movement would strain the point of fracture. In the latter case, however, if early movement seemed important, I would prefer to open the fracture and fix the fragments rather than to give up the idea of early movement. Depending upon the situation, motion may be begun the day after operation, or it may be necessary to postpone it for seven to ten days until some cementing together of fragments has occurred. The movement must be active in character, that is, produced by the patient's own muscles, and the distal segment of the limb must be supported, either manually or mechanically. The motion may be of the slightest, so long as it represents a beginning.

I do not attribute the magic virtue to early movement which apparently has been claimed for it by many enthusiasts. I do know, however, that if two fractures of the ankle, of similar character, be reduced and splinted in plaster and

one is completely fixed for six weeks and the other is treated by daily mobilization, at first removing only the anterior half of the cast and allowing what movement is possible, and after two weeks by lifting the leg from the cast and encouraging active use, that at the end of six weeks one will be stiff and painful while the other will have normal mobility without pain. The latter will permit painless weight bearing at the end of eight weeks, while the former will be stiff and lame for four months or even longer.

Early mobilization of joint fractures necessitates much time and trouble and requires careful supervision. This must be emphasized, because there is a tendency for the busy physician to splint such a fracture, and, if the X-ray shows good position, to content himself with the reflection that he has done all that is possible and the rest is the work of nature. We can instance a woman of 56 with a fracture of the surgical neck of the humerus. The fracture was reduced satisfactorily and an aeroplane splint applied. The original dressing was never touched for three months and during that time the arm was never moved. It has taken four months for that woman to recover enough function to even begin to use the arm, and the stiffness of the hand and elbow has been more troublesome than that of the injured shoulder.

Many other examples could be cited to show the disastrous results of prolonged fixation in joint fractures. The remedy lies in early movement, and this duty is one that rests upon the physician himself and which cannot with safety be delegated. Fracture treatment requires constant attention and endless care and the physician who assumes charge of a case must make up his mind to give it all the time that is necessary in order to obtain a good result. This is true of the ordinary diaphyseal fracture, but it is a hundred times more necessary with the joint fracture.

Mobilization of a fractured joint must be performed daily, with gradual increase both in the number and the amplitude of the movements. Pain is the warning sign and motion should be carried out to a point just short of where pain would be produced. To pass the point of tolerance is to cause muscle spasm and diminution in function instead of increase. Passive movement is usually to be condemned and we have seen many cases in which positive harm has been done by forced movement and manipulation. Massage and other forms of physiotherapy are valuable aids in hastening the restoration of function but are by no means necessities. Loyal co-operation in active voluntary movements is the great essential. This should be explained, as otherwise the patient tends to depend upon other forms of physiotherapy, not understanding that it is his own efforts which count the most.

As healing progresses, greater liberty and a wider range of movement are permitted. Gradually fixation is discontinued and light use allowed. Restrictions are gradually removed until function is finally re-established. In the lower limb special provision must be made in regard to weight bearing. Fracture union must be well established to withstand this strain, and we have seen cases in which deformity had recurred or traumatic arthritis developed as a result of too early weight bearing. Hence in fractures of the ankle, knee, or hip, we would lay special emphasis either upon restriction of weight bearing for a considerable period, with the use of crutches, or upon weight bearing with protection by the use of a caliper brace. Here it pays to make haste slowly.

COMMINUTED JOINT FRACTURES

The grossly comminuted joint fractures such as are seen chiefly in the elbow and knee deserve special mention. These constitute the most difficult problems of fracture treatment and, as a rule, are not amenable to reduction methods. Some yield to traction, particularly skeletal traction, while others can be brought into alignment by open procedures with internal fixation. Still others are obviously doomed to ankylosis and in them our chief aim must be to fix the part in the optimum position for ankylosis and there maintain it until that end is achieved. A joint which is solidly fused in useful position is strong, painless and causes but slight disability, whereas a range of movement of only a few degrees serves no useful purpose, is always painful and is usually the cause of serious disability. Indeed, in some of these cases it would be the part of wisdom to excise the articular surfaces for the purpose of securing ankylosis.

A plan now being advocated vigorously by Hitzrot, in fractures of the elbow, is to remove the loose fragments a few days after injury, thus accomplishing in a way what is done by certain arthroplastic operations to overcome ankylosis. The entire fracture problem is thus eliminated as no fragments remain to unite and there is no bar to the immediate inauguration of motion. There is much to sustain this point of view in badly comminuted fractures and it is worthy of trial in carefully selected cases. Discrimination will be necessary or there is likely to be removal of too much bone with the production of a flail, unstable joint. Such a result would be less disastrous in the elbow than in a weight-bearing joint like the knee. The procedure is yet an experiment and cannot be applied in a routine way.

SPECIAL FRACTURES

In this discussion it has been necesary to deal in generalities. Neither the time at our disposal nor the size of the subject have permitted the consideration of individual fractures or any precision of detail. Necessarily there are omissions.

Before closing, I wish to speak of certain injuries which constitute exceptions to the therapeutic principles which have been laid down. Thus fracture of the carpal scaphoid and fracture of the neck of the femur are noteworthy as joint fractures in which good results can be obtained only by complete and prolonged fixation. The chief question here is how to obtain union of the fracture. There can be no function in the absence of union, and, in comparison with this danger, joint stiffness and traumatic arthritis become negligible risks.

With regard to fracture of the scaphoid, all authorities are in agreement that immobilization is necessary. The wrist should be fixed in dorsal flexion by means of a long plaster of Paris splint extending from the elbow to the finger tips and including the thumb. Fixation should be maintained for four weeks and at the end of this time a leather wristlet should be applied and worn for four weeks longer.

In respect to the treatment of fractures of the neck of the femur there is no doubt that the Whitman method of reduction, followed by the application of a plaster spica with the hip in the position of wide abduction and internal rotation, marks a great advance. Fixation must be maintained for about 12 weeks and a caliper brace to protect the hip from the strain of weight bearing must be worn for a further period of at least six months. This is drastic treatment for the feeble, elderly type of patient, but with it the incidence of non-union can be greatly reduced, although not entirely eliminated. There certainly can no longer be any justification for the old policy of laisser faire.

In conclusion I wish to present my excuses for selecting the subject of joint fractures, particularly as I have brought to you no fresh knowledge, no new ideas, and, above all, no certain solution of the problem. It does seem apparent, however, from a study of available data, that such injuries are responsible for a large amount of disability and that in many cases this is unduly long. I have tried to show you the factors which operate to produce this result and I am confident that improvement may be brought about by more general recognition of the importance of accurate reconstitution of articular contour and of early mobilization of the injured joint.

ORIGINAL ARTICLES

CLINICAL SPIROGRAPHY*†

II. Observations in Bronchial Asthma

BY SEELEY G. MUDD, M.D., BOSTON

The apparatus and method employed in this study are the same as those described in Paper 1 of this series.

Three patients, suffering from bronchial asthma, were studied. Observations were made when they were having marked respiratory difficulty, and before and after treatment with epinephrin chlorid and atropin.

The first patient, Mrs. L. G., was a housewife, 39 years old. Her chief complaint was difficulty in breathing and headache. The present illness dated from a period 18 years ago, after the birth of her third child, when she first experienced difficulty in breathing. The attacks had recurred every few months and lasted for various periods of time, frequently three or four weeks. There seemed to be no relation to seasons, flowers or food. However, the severe attacks seemed to be precipitated by over-activity. The patient was very irritable and had a mild psychoneurosis. The physical examination showed a typical asthmatic chest, with numerous diffuse musical râles. She had a slight watery nasal discharge, and occasionally raised a little grayish sputum. The examination of the heart was negative, and no focus of infection was made out. Record No. 1 shows the respiratory tracing of this patient. At *A* the type of her breathing was recorded when she was having slight distress, and at this time room air was used in the machine. One will observe the volume per breath to be 303 c.c., the respiratory rate 17.2, and total ventilation 5.21 liters. The vital capacity was recorded as 1508 c.c. By dropping perpendicular lines to the time record from points on the respiratory tracing, at the beginning of inspiration, the height of inspiration, and the end of expiration, one is able to determine quantitatively the time relationship between the inspiratory and expiratory phases of the respiratory cycle. In this case expiration lasted 2.2 seconds, while inspiration comprised only 1.3 seconds, and the ratio of expiration to inspiration was determined to be 1.69. This ratio shows a prolongation of the expiratory phase, the ratio for normal individuals varying usually from 1.3 to 1.5. In other words, for the normal individual the expiratory phase is about 50 per cent. longer than the inspiratory phase. In the respiratory tracing, inspiration is the upward swing, and expiration the downward swing of the recording pen.

*From the Medical Service of the Massachusetts General Hospital, Boston. Aided by funds from the Department of Medicine, Harvard Medical School. Awarded Boylston Medical Society Prize, 1924.

†Continued from Volume 193, page 309.

Because of the possibility of an oxygen want prevailing in cases of asthma, it was determined to try the effect of breathing pure oxygen, and the record at *B* shows the result obtained. It will be noted, in this case, that after the patient had breathed pure oxygen for four minutes, the volume per breath had increased 63 per cent., the respiratory rate had decreased 29 per cent., and the minute volume increased 26 per cent. The ratio of expiration to inspiration in this case was 1.8. The vital capacity was recorded as 1480 c.c., a reduction of 2 per cent. over the previous value. In the vital capacity tracing there is a marked prolongation during the period when the reserve air is being expired. This indicates the difficulty that the asthmatic patient has in attempting forcibly to empty the lungs. Whether or not the increase in volume per breath and decrease in respiratory rate with oxygen is due to a psychic element, one is unable to decide. However, the increase in minute volume is not readily explained by oxygen inhalation. It is not likely that oxygen itself will reduce bronchiolar spasm. Furthermore, if anoxemia prevailed and was relieved by oxygen, the minute volume would tend to be reduced rather than increased.

At *C* a hypodermic injection of epinephrin chlorid m. V was administered, and the Record D was taken one minute later. The patient was able to breathe without difficulty, and the record shows that the volume per breath had increased 84 per cent., the respiratory rate decreased 6 per cent., and the minute volume increased 74 per cent. It will be observed that the ratio of expiration to inspiration had not markedly changed, the value being 1.84. The vital capacity had increased 27 per cent. The record at *E* shows the type of breathing during the fourth minute after the hypodermic. At this period the patient was breathing comfortably, and the volume per breath had increased 111 per cent., the respiratory rate decreased 12 per cent., and the minute volume increased 89 per cent. It is interesting to note that the ratio of expiration to inspiration had been reduced to 1.31, which is within the normal range. The vital capacity had increased to 2570 c.c., or 71 per cent. Even at this time, however, one observes the length of time required for the pushing out of the reserve air from the lungs. The record shows graphically the change in type of respiration in the asthmatic when epinephrin chlorid is administered, producing an active dilatation of the bronchioles.

Another tracing was made of L. G., before and after a subcutaneous injection of .01 of a grain of atropin. This record was made several days later, when the patient was in much better condition, and showed higher normal values. However, during the fourth minute after the atropin was administered, the volume per breath was reduced 9 per cent. as compared with an increase of 111% in the volume per breath at a similar interval following the injection of epinephrin, in Record No. 1. The respiratory rate at the fourth minute following the use of atropin was reduced 10 per cent. as compared with a decrease of 12 per cent. at a similar period after the use of epinephrin. The minute volume at the fourth minute following the administration of atropin was reduced 19 per cent. as compared with an increase in minute volume of 89 per cent., after a similar period following epinephrin. Atropin did not relieve the respiratory distress, as did epinephrin, from the subjective point of view. The respiratory tracings comparing the action of these two drugs indicate that epinephrin is preferable. The atropin, of course, acts by paralyzing the para-sympathetic nerve endings in the bronchioles. This patient obtained marked relief with epinephrin for about three hours, as compared with little or no benefit with atropin.

Asthmatic patients frequently show an increased sensitiveness to epinephrin. Alexander and Paddock[1] indicated in a series of twenty cases of asthma that the majority reacted to epinephrin with an abnormal rise in blood pressure and pulse rate. Furthermore, they stated that asthmatics gave other characteristic signs denoting sensitiveness to small doses of this drug, by showing pallor, tremor and rarely rigor. Park[5] demonstrated the reaction to epinephrin of excised rings of bronchi from an ox; relaxation occurred in every case, and was dependent upon the concentration of the drug.

Respiratory studies of normal, emphysematous, and asthmatic persons were carried out by Staehelin and Schültze[6] in 1912 by means of a spirograph and pneumographs attached to the chest and abdomen. They indicate that in normal persons the abdomen begins both phases of the respiratory cycle, and that in emphysema the action of the abdomen is greatly intesified, while in asthma the type of breathing is changed, since the lungs initiate inspiration and expiration.

The second patient, E. P. C., was a carpenter, 56 years of age. His chief complaint was dyspnea, without exertion. His respiratory difficulty began four years ago, and followed a severe attack of influenza. Since then he has been unable to work. The chronicity of his symptoms and their daily occurrence strongly suggested a focus of infection to the consultant who was called. The physical examination showed tonsils that were large and cryptic. There was marked pyorrhea and three abscessed tooth roots. The chest was of the asthmatic type, and characteristic musical râles were present. The sputum was negative for tubercle bacilli. The patient reacted to a skin test, in which a vaccine made of mixed influenza bacilli was used, the wheal being 3 inches in diameter after 24 hours. The respiratory tracing in this case is shown in Rec-

ord No. 2, Part A, and indicates a very pronounced type of asthmatic breathing. One will note the angular type of respiration and the absence of a pause between inspiration and expiration, or between expiration and inspiration. The tracing, particularly during the expiratory phase is uneven, which may indicate the use of the accessory muscles of respiration. This detail does not show in the reduced tracing. The resting value for volume per breath was 499 c.c., the respiration rate 20.65, and minute volume 10.34 liters. The ratio of expiration to inspiration was 1.67, and the vital capacity 1182 c.c. At the end of a forcible expiration coughing occurred. The record at *A* was made when the patient was having marked respiratory difficulty, and was leaning forward with his hands on his knees. The tracing at *B* shows the type of respiration after breathing pure oxygen for a period of 4 minutes, with little or no subjective relief. At this time, the volume per breath had decreased 18 per cent., the respiratory rate was reduced 5 per cent., and the minute volume had decreased 23 per cent. The vital capacity, at this time, could not be accurately determined, because of coughing which occurred during a marked expiratory attempt. Fifteen minims of epinephrin chlorid were administered at *C*, and the Record D was taken during the second minute after the hypodermic injection. It shows an increase in volume per preath of 29 per cent., an increase in the respiratory rate of 22 per cent., and an increase in the minute volume of 57 per cent. At this time the patient was breathing much more comfortably. The expiration-inspiration ratio was 1.7. It will be observed that the vital capacity had increased 9 per cent., but the patient did not make a full expiratory effort, because of his fear of coughing. At *E* one may observe the type of respiration during the sixth minute after the administration of epinephrin. The volume per breath, respiratory rate, and minute volume, all show a slight increase. There is still a marked prolongation of the expiratory phase, which is indicated by an expiration-inspiration ratio of 2.0. The vital capacity, at this point, showed an increase of 11 per cent., although the patient did not attempt to forcibly expire. E. P. C., is a very severe asthmatic, and the effect of epinephrin was quite transitory, and only gave relief for approximately 20 minutes. Atropin was tried in this case, without benefit.

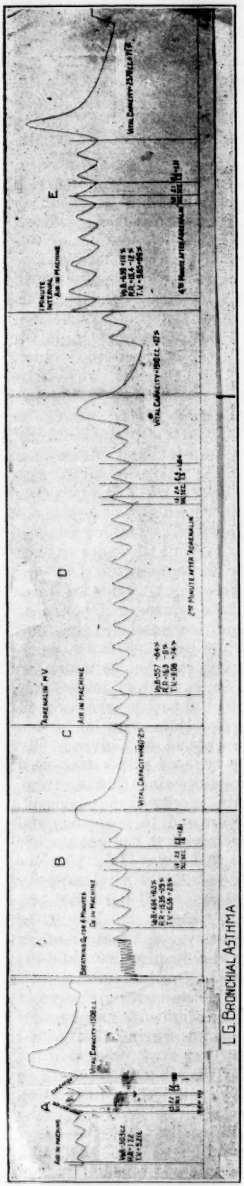
Hoover and Taylor[3] suggested that the real difficulty of ventilation in emphysema and asthma lies in the distention of the infundibula, and this fails to allow equal diffusion of CO_2 throughout the alveolar air.

The high CO_2 content of the alveolar air in asthma and obstructed respiration, was considered by Friedman and Jackson[2] to be due, in general, to a circulatory cause. They maintain that the rise in intrabronchial pressure during the long expiration interferes with the free flow of blood through the pulmonary capillaries and causes a damming back of the blood on the venous side. There is, therefore, a consequent accumulation of CO_2 in the blood with the liberation of CO_2 into the alveolar air, chiefly during the short inspiratory phase of asthmatic breathing.

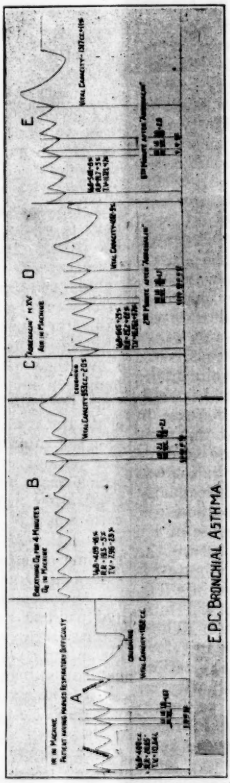
The third patient, J. H., was an unmarried woman of 49. Her present illness started six years ago, when she experienced difficult breathing on exertion. She raised four or five ounces of watery sputum a day. There was no evident relationship to seasons, flowers, weeds, or food. The attacks were aggravated by exertion. A consultant stated that the cardiac factor was not important. The physical examination showed a cyanotic, obese, orthopneic individual. The teeth were carious, and the chest was of the typical asthmatic type, filled with squeaking and musical râles. Record No. 3, Part A, shows the respiratory tracing of this individual shortly after entrance to the hospital, and indicates a volume per breath of 407 c.c., a respiratory rate of 27.05, and a minute volume of 11.01 liters. The expiratory-inspiratory ratio in this case was not prolonged, the value being 1.3. The record at *B* shows the type of respiration after pure oxygen had been inspired for three minutes. At this time, the volume per breath was increased 3 per cent., the respiratory rate decreased 25 per cent., and the minute volume decreased 18 per cent. The patient said that she breathed more easily, which may be indicated by the reduction in respiratory rate. The expiratory-inspiratory ratio was 1.6. The vital capacity increased 21 per cent. At *C* a hypodermic injection of ten minims of epinephrin chlorid was given. The record at *D* shows the type of respiration during the second minute following the injection. The volume per breath increased 8 per cent., the respiratory rate decreased 15 per cent., and the minute volume decreased 6 per cent. The expiration-inspiration ratio was 1.5. At the end of the sixth minute at *E*, the vital capacity was 1580 c.c., an increase of 100 per cent. At *F*, is shown the type of respiration during the eighth minute. The volume per breath had increased 27 per cent., the respiratory rate decreased 56 per cent., and the minute volume decreased 19 per cent. This indicates a change in type of respiration with a slight decrease in minute volume. The breathing during this period was much more efficient than at *A*, because of the increase in volume per breath and decrease in respiratory rate. The expiratory-inspiration ratio at this time was recorded as 1.58. The patient breathed more easily, and the relief produced by epinephrin lasted for two hours. This patient showed a type of bronchial asthma

intermediate between a rather mild case, as in L. G., and a very severe case, as in E. P. C.

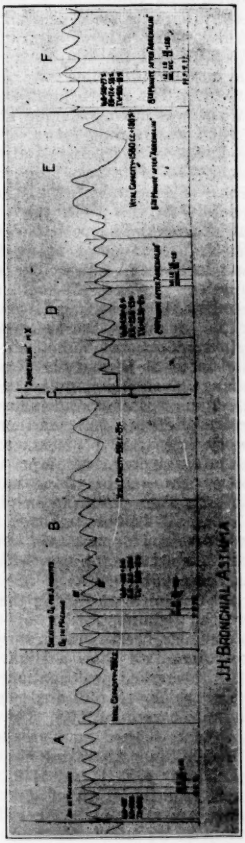
In addition to the bronchiolar hypertonus in asthma, Huber and Koessler[4] have demonstrated a number of pathological changes in the bronchial tree. They showed an increased thickness of the bronchiolar muscle, a hyperemic cellular infiltration in the wall, and a marked hypertrophy of the mucous glands. The hyperemia, cellular infiltration, and increased activity of the mucous glands tend to produce thickening and swelling. This condition may produce, either mechanically or chemically, an irritation of the peripheral nerve endings in the tube, which may indirectly cause bronchospasm.



RECORD NO. 1. Respiratory tracings of a patient with bronchial asthma before and after epinephrin.



RECORD NO. 2. Tracings of the respiration in a severe asthmatic before as well as after epinephrin.



RECORD NO. 3. Respiratory tracings of a person with bronchial asthma before and following epinephrin.

CONCLUSIONS

(1) The type of breathing in the asthmatic patients studied, showed a prolongation of the expiratory phase, in most cases. The expiration-inspiration ratio in cases of marked bronchial asthma varied from 1.5 to 2.1, as compared with an expiration-inspiration ratio of 1.3 to 1.5, in normal individuals.

(2) The respiratory records indicate the manner in which the breathing in asthma is facilitated, by the use of epinephrin chlorid. The volume per breath is usually considerably increased, the respiratory rate reduced, the minute volume increased, and the expiration-inspiration ratio diminished, following the injection of the drug. The vital capacity was increased in all instances. In one case (J. H.) the volume per breath was increased, the respiration rate greatly reduced, but the total ventilation was not greatly changed, following epinephrin. In a very severe case (E. P. C.) the expiration-inspiration ratio, and the respiratory rate, were not materially altered by the use of the drug.

(3) The time required for the asthmatic to complete the supplemental phase, during a vital capacity tracing, was considerably prolonged, before as well as after epinephrin.

(4) In severe cases of asthma, the effect of epinephrin chlorid, even in large doses, was less marked and more transient in character, than in mild cases.

(5) Atropin is of some value in the treatmet of asthma. However, epinephrin chlorid is much more efficacious, as shown in the respiratory tracings, and also from the subjective point of view.

(6) Oxygen therapy is of questionable value in asthma.

In this investigation I desire to thank Dr. James H. Means and Dr. Francis M. Rackemann for their valuable suggestions and coöperation.

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III. Observations on a Variety of Respiratory Abnormalities

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In this paper spirographic studies on patients with a variety of ailments are described. The method and apparatus employed are the same as those described in Paper 1 of this series.

CASE NO. 1—FRACTURE OF SIXTH CERVICAL VERTEBRA

M. B. was a widow, 52 years old. Nine days before her entrance into the hospital she fell from a 15-foot roof and struck her right shoulder and back. A diagnosis of fracture of the sixth cervical vertebra was made. The patient was completely paralyzed below the armpits, and there was complete loss of sensation over the paralyzed area. There was partial paralysis of the arms, with considerable loss of sensation. She was unable to control her sphincters. With the fracture of the sixth cervical vertebra, and compression of the spinal cord, the entire intercostal musculature was paralyzed, so that the breathing was of the diaphragmatic type.

Record No. 1 shows the type of respiration in this case. It will be noted that the volume per breath was within normal limits, the respiratory rate was slightly elevated, and the total ventilation 7.11 liters. The ratio of expiration to inspiration is slightly elevated, being 1.55. The vital capacity in this case is markedly reduced, being only 790 c.c. It will be noted that there is practically no reserve air in the vital capacity tracing. When the diaphragm contracted, the maximum inspiration, in this case, amounted to the entire vital capacity. The expiratory phase of the complemental air is passive, based upon the relaxation of the diaphragm. In this case, since it is impossible for the thoracic musculature to compress the thoracic cage, the reserve air is almost entirely absent. It is surprising to see a type of respiration, so nearly within normal limits, in this patient who had such a severe lesion.

CASE NO. 2—PSYCHONEUROSIS

E. E. M. was an unmarried graduate nurse, 37 years old. In December, 1921, she had a right lobar pneumonia, with a relapse. The convalescence was greatly prolonged, and during that time she had hallucinations. Since her illness she has been unable to work, and has had transitory chest pains. Another residual of the pneumonia was a very rapid respiration associated with dyspnea. Since her illness, nursing had been very distasteful to her. The physical examination of the patient was essentially negative. As one observed her respiration, while she was lying comfortably in bed, one perceived a rapid shallow type of breathing, with an occasional sigh or deep breath occurring three or four times a minute. When asleep, her respiration was essentially normal in type and the rate varied from 20 to 24 per minute.

Record No. 2 shows a tracing of this patient's breathing. It will be noted that during the first minute there were four deep respirations, the average depth of which was 1163 c.c., and the minute volume was 4.67 liters for the deep respiration only. Between these deep respirations there are a number of very shallow respirations, aver-

aging 83 c.c. which do not show in the reduced tracing. These small respirations, however, do not affect the alveolar ventilation, since the physiological dead space in normal adults at rest has been determined by several observers to be between 100 and 175 c.c. With the ventilation made possible by the four deep inspirations, this patient was able to provide for sufficient air intake per minute, while the 78 small respirations amounted to little more than panting. Counting the total number of respirations, consisting of 82 per minute, the total ventilation was 11.13 liters. The respiratory record taken during the second minute shows fundamentally the same conditions. The vital capacity was somewhat reduced, amounting to 2760 c.c. A diagnosis of Psychoneurosis of the Compulsive Type was made. It was thought by the attending physicians that this phenomenon of breathing was possibly a defense reaction, based upon the fact that the patient was a graduate nurse and was familiar with the increase in respiratory rate during pneumonia.

CASE NO. 3—EFFORT SYNDROME

J. S. was 26 years old, a Greek by birth, and an ex-service man. He had no occupation. His present difficulty dated from an accident which occurred six years ago. It seemed that, when the patient was in the army, one of his tent-mates had a nightmare, and struck the patient across the front of his chest. Following this accident, the patient became aware that his heart was beating rapidly. This condition was checked up by the Company Medical Officer, two months later, after which J. S. was hospitalized. Since that time he had done no work and had been going from hospital to hospital. His condition seemed to be more acute during the past few months, and occasionally he felt his heart "rub back and forth across his spine." The physical examination was essentially negative. He was an "air swallower" and very uncoöperative. The diagnosis in this case was effort syndrome.

Record No. 3 shows a respiratory tracing of this individual. His normal respiratory rate was between 25 and 40, but when one attempted to make a tracing, the patient voluntarily increased the respiration rate several-fold. The record shows a respiration rate of 150 per minute, the volume per breath at *A* being 145 c.c., and the total ventilation 21.8 liters. Assuming a dead space of 125 c.c. in this case, the alveolar ventilation would be 3 liters, which is below normal. At *B*, about 75 seconds later, the volume per breath had increased to 207 c.c., the respiratory rate had remained at 150, and the total ventilation increased to 31.1 liters. Assuming a similar value for the dead space, the alveolar ventilation at this time would be 12.3 liters. At *C*, the volume per breath had gradually increased to 290 c.c., the respiratory rate had not changed, but the total ventilation had increased to 43.5 liters. Assuming a similar value for the dead space, the alveolar ventilation at this time would be 24.6 liters.

Haldane, Meakins, and Priestly[13] have shown that rapid shallow breathing tends to produce anoxemia. Of course, this tracing lasted for a period of less than 4 minutes, during which the rapid respiration rate was maintained, but there was no evidence of cyanosis. The rapid upward slope of the respiratory tracing shows that the patient was using 560 c.c. of oxygen per minute, which is considerably in excess of the normal resting requirement. This rapid shallow respiration was associated with considerable muscular exertion, increased metabolism, and accelerated pulse. The patient seemed to be able to maintain this rapid respiratory rate without great discomfort, and refused to breathe into the spirograph at his normal respiratory rate.

CASE NO. 4—LOBAR PNEUMONIA

Mrs. W. G. was a housewife, 27 years old. A diagnosis of pneumonia with consolidation of the left lower lobe, was made. The organism was type I.

Record No. 4, Part A, shows a respiratory tracing of this patient, the third day after the onset of the disease. At this time the temperature was 105° F., and the basal metabolism + 71 percent. Referring to the record, one observes that the volume per breath was 359 c.c., the respiratory rate 28.7, and the minute volume 10.3 liters. The inspiratory phase of respiration is designated by the up-stroke of the writing-point, and one observes a "plateau" between inspiration and expiration. There is also a small knob at the end of inspiration, which is not shown in the reduced tracing. This "plateau" type of respiration is presumably dependent upon the closing of the glottis. It is associated with an expiratory grunt and can be produced voluntarily by a normal individual. The suggested explanation for this type of breathing is that, following an inspiration, a small amount of air is expired associated with a slight expiratory grunt, which produced the knob referred to in the tracing. Then the glottis is closed and the "plateau" is formed. At the end of the "plateau," the glottis opens, a second expiratory grunt occurs and expiration results. In this case there was a double expiratory grunt. The ratio of expiration to inspiration showed a considerable variation, which is indicated in the record, the value being from 1.4 to 1.87. The vital capacity was markedly reduced, and in this case was 656 c.c.

The abnormal pulmonary ventilation in pneumonia is produced by a number of factors, among which the following may be mentioned: During the height of the fever there is an increased metabolism, comparable to that shown by Coleman and DuBois[8] in typhoid. Peabody[27] has shown that in the terminal stages of fatal lobar pneumonia the oxygen content of the blood is below normal, so that an oxygen want prevails. The

dyspnea may be due in part to the presence of froth in the bronchial tree, as suggested by Hoover[17]. In addition, there is the factor of fatigue of the respiratory center, as indicated by Newburg, Means, and Porter[24] when the ventilation falls. Pleural pain tends to reduce the volume per breath. The dyspnea, associated with pneumonia is closely related to the vital capacity, so that when the volume per breath is one-half the vital capacity, difficult breathing results. In Record No. 4, Part A, it will be noted that the volume per breath is more than one-half the vital capacity. The cyanosis observed in pneumonia has been stated to result from the admixture of oxygenated with unoxygenated blood, after its passage through the lungs.

Record No. 4, Part B, shows the type of breathing on the third day after the crisis. It will be noted that the "plateau" type of respiration no longer prevails, and that the volume per breath, respiratory rate and total ventilation have increased markedly. Meakins[20] has indicated that the average tidal air before crisis is 255 c.c., while after the crisis the value is about 500 c.c. A marked increase in the volume per breath, after crisis, is indicated in this record. The expiratory grunt no longer prevailed. However, at this period, the patient was extremely uncomfortable, due to the serum sickness and extreme itching which followed the administration of 300 c.c. of type I anti-pneumococci serum. The vital capacity in Part B will be observed to have increased to 852 c.c. Part C, of Record No. 4, shows the type of breathing on the eleventh day after crisis, and after the serum sickness had completely subsided. At this time, one will observe that the volume per breath has increased, the respiratory rate decreased, but that the total ventilation is still markedly elevated. The vital capacity at this stage is recorded as 1213 c.c., or about double the value before crisis.

The "plateau" type of respiration has been observed in other patients, namely, decompensated cardiacs with an expiratory grunt, massive collapse of the lung, and in a case of respiratory depression in uremic poisoning.

CASE NO. 5—CARDIAC DYSPNEA

J. R. was an Italian laborer, 40 years old. He was markedly decompensated, when he entered the hospital.

Record No. 5 shows a respiratory tracing of this patient who was markedly orthopneic, and who had an associated expiratory grunt. One will observe the "plateau" type of respiration, in Part A, which is not clearly shown in the reduced tracing. In Part B, the volume per breath is somewhat larger and the tendency to "plateau" type is markedly reduced, but there is a knob at the end of inspiration, which does not show clearly in the reduced tracing. The expiratory grunt was present at this time. At *C* the patient was breathing more deeply, and the knob or "plateau" is not present. The patient, at this time, was not grunting during the expiratory phase. This record indicates that with the rapid shallow breathing and expiratory grunt, the "plateau" type of respiration prevails, and that, if the volume per breath is increased, the tendency for the "plateau" formation is reduced, even though the expiratory grunt is present. On the other hand, if a deeper and slower type of respiration prevails, and the expiratory grunt is not present, the "plateau" type of respiration disappears. The patient was extremely dyspneic, and one will note the rapid respiratory rate, and greatly increased minute volume in this tracing. The record at *C* shows a greater volume per breath and slightly reduced respiratory rate, and was associated with less discomfort. The vital capacity was greatly reduced.

There are a number of factors concerned in cardiac dyspnea. Peters[20] has demonstrated a reduction in alveolar CO_2 in decompensated cardiacs, and suggests that there is a carbon dioxide acidosis which results from an alternation in the respiratory exchange. Harrop[15] has indicated that there is evidence of arterial anoxemia in congestive failure. The vital capacity is markedly reduced in decompensated cardiacs, as shown by several observers, including Peabody and Wentworth[20]. The severity of the dyspnea is apparently related to the reduction of vital capacity. Reference has already been made to the work of Haldane, Meakins and Priestly[13] who indicated that oxygen want prevails when the lungs expand unevenly, due to rapid shallow breathing.

CASE NO. 6—MASSIVE COLLAPSE OF THE LUNG

T. C. was a boy 12 years of age, who developed a massive collapse of the right lower lobe following an operation for left inguinal hernia performed under local anesthesia.

Record No. 6, Part A, shows a respiratory tracing in this case, three days after the collapse developed, and while the right chest was immobile. The signs in the right chest were pathognomonic of this condition, with displacement of the heart to the right. It will be noted that the volume per breath was 271 c.c., the respiratory rate 19.5, and the total ventilation 5.3 liters. The type of respiration was quite irregular. The vital capacity was greatly reduced, the value being 790 c.c. The patient was not having marked respiratory difficulty. Record No. 6, Part B, shows a tracing four days later, at a time when the condition was less marked, but the right lung had not fully expanded. The heart, however, had moved very slightly to the left. It will be observed that the volume per breath is slightly increased, the respiratory rate almost unchanged, and the minute volume increased to 6.16 liters. The irregular type of respiration still prevailed, but the vital capacity had incerased to 1320 c.c. The patient at this time was quite comfortable.

Record No. 6, Part C, shows a tracing made four days later, when the physical signs in the right chest had entirely disappeared. It will be observed that the type of respiration had become more rhythmical, and that the vital capacity had increased to 1350 c.c. A "plateau" type of respiration was present on the day following the collapse, but was not associated with an expiratory grunt.

Elliott and Dingley[10] have reported eleven cases of post-operative massive collapse, preceded by muco-purulent expectoration and fever. Many causes have been suggested for this condition, but these investigators consider that the collapse is due to the combined action of obstruction of the bronchioles with inflammatory exudate, and reflex inhibition of one-half of the diaphragm.

CASE NO. 7—DIABETIC ACIDOSIS

M. P. was a Hebrew, 45 years of age, who was brought to the hospital in a condition of marked diabetic acidosis.

Record No. 7, Part A, shows the hyperpnea which prevailed one hour after entrance. The volume per breath was 840 c.c., the respiratory rate 32.4, and total ventilation 27.2 liters. At this time, the urine showed 5 per cent. sugar and was strongly positive for acetone and diacetic acid. Strenuous treatment was begun immediately, and insulin, copious amounts of liquid, and large doses of sodium bicarbonate were administered. The following day, he showed 1 per cent. sugar in the urine, and the Marriott test was 35 volumes percent. Part B shows a tracing made 41 hours after entry. The patient was then lying comfortably in bed. It will be observed that the hyperpnea had entirely disappeared, and that the volume per breath was 280 c.c., the respiratory rate 14.1 and total ventilation 3.95 liters. It is interesting to note that the total ventilation one hour after entrance showed an increase of 590 per cent. over the value recorded 40 hours later.

CASE NO. 8—UREMIC COMA

E. W. was a housewife, 51 years of age, who entered the hospital in uremic coma. The blood pressure and pulse were not greatly elevated. The urine showed a large trace of albumin, and many white and red blood cells.

Record No. 8, Part A, shows a respiratory tracing shortly after entrance. The type of respiration was very slow and labored, as indicated by the volume per breath of 920 c.c. and respiratory rate of 10.1. The ratio of expiration to inspiration was markedly prolonged, the value being 2.8. This patient showed a marked contrast with the patient in diabetic acidosis, discussed previously, since in diabetic acidosis there prevailed extreme hyperpnea with rapid deep breathing, while in this case of uremic coma the breathing was very slow, deep and labored. Referring to Figure No. 7, Part I, of this series, one will observe the carbon dioxide dissociation curve for whole blood in a case of uremic coma. This curve is very low, as compared with the normal curve for whole blood, and the *A*-point on the uremic curve shows a pH of 6.95, compared with the *A*-point on the normal curve, which indicates a pH of 7.33. A carbon dioxide dissociation curve for a patient in diabetic coma is also shown. This curve is slightly above that of the uremic patient, but the *A*-point will be observed to fall on a line corresponding to pH of 7.15.

Record No. 8, Part B, was made the following day, and shows the beginning of an irregular type of respiration, with a decrease in the total ventilation. There is still a high ratio of expiration to inspiration. Because of the marked acidosis, as shown by the very low carbon dioxide dissociation curve and pH, 40 grams of sodium bicarbonate were administered intravenously durinng the next 24 hours. Following this treatment the patient became temporarily much brighter. She opened her eyes, smiled, talked a little, and would obey simple directions. Record No. 8, Part C, was taken some hours after the last injection of sodium bicarbonate. The patient had again lapsed into a comatose condition. One will observe that the respiratory type is very irregular, and because of the tendency of two shallow and two deep respirations to occur alternately, it is suggested that the breathing is probably of the Biot type. Hewlett states that this variety of respiration is presumably due to direct involvement of the respiratory center, and that it occurs particularly in meningits. However, no satisfactory explanation has as yet been suggested. It will be observed that the total ventilation has decreased, but that the ratio of expiration to inspiration is still abnormally high. Record No. 8, Part D, shows a tracing shortly before exodus. One observes a "plateau" type with marked periods of apnea occurring between inspiration and expiration. At D′ and D″ one will note a marked arrhythmia between expiration and inspiration. The respiratory rate at this period was 4.4, and the total ventilation reduced to 3.44 liters. The "plateau" type of respiration, in this case, cannot be explained on the basis of an expiratory grunt. However, closure of the glottis or sustained contraction of the diaphragm, immediately after inspiration, would produce respirations of this character. The record shows the manner in which the respiratory center failed, and the way in which the type of breathing changed in uremic coma from slow, deep, labored respirations to a slower irregular type with a gradual decrease in minute volume.

CONCLUSIONS

Respiratory tracings are reported of a number of respiratory abnormalities, including fracture of the sixth cervical vertebra, psychoneurosis, effort syndrome, lobar pneumonia, cardiac dys-

pnea, post-operative massive collapse of the lung, diabetic acidosis and uremic poisoning.

The apparatus is well adapted to study certain phases of the respiratory cycle in a quantitative manner, and it should prove to be most useful in subsequent work.

In this study I desire to thank Dr. James H. Means for his helpful suggestions and coöperation. To Dr. Frank T. Hunter I am indebted for the effort syndrome tracing.

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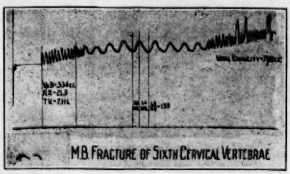
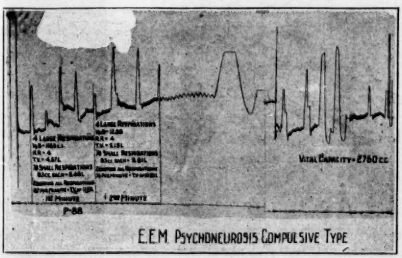
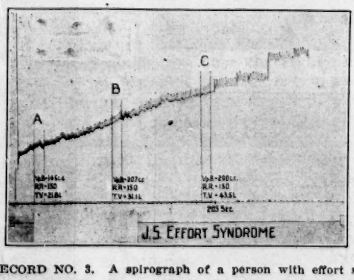


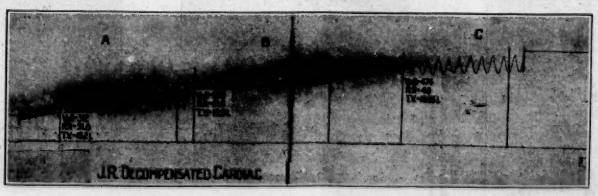
RECORD NO. 1. Tracing following fracture of the sixth cervical vertebrae.



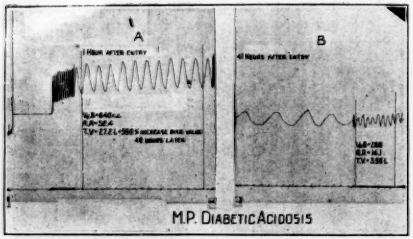
RECORD NO. 2. Respiratory tracing in a case of psychoneurosis.



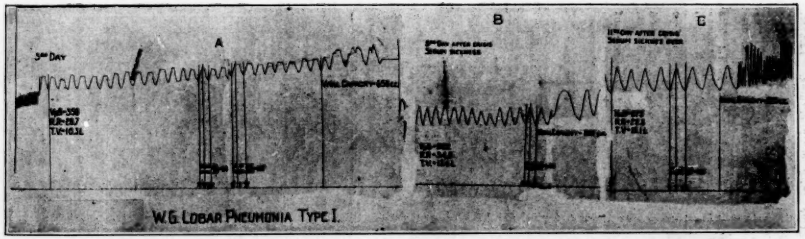
RECORD NO. 3. A spirograph of a person with effort syndrome.



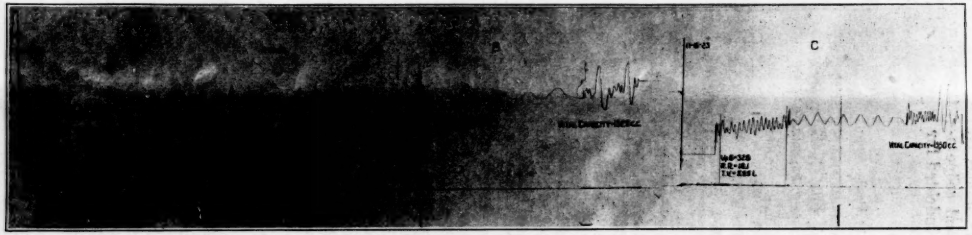
RECORD NO. 5. A tracing of the respiration in a decompensated cardiac.



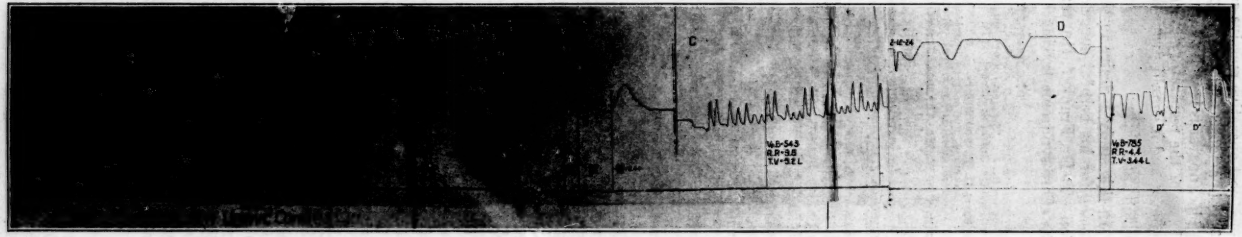
RECORD NO. 7. A tracing showing air-hunger in a case of diabetic acidosis and also the patient's normal respiration following treatment 40 hours later.



RECORD NO. 4. Respiratory tracings in a case of lobar pneumonia before and after crisis.



RECORD NO. 6. Respiratory tracings in a case of post-operative massive collapse of the lung, and during the recovery period.



RECORD NO. 8. Tracings showing respiratory failure in a case of uremic coma.

Case Records
of the
Massachusetts General Hospital

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICO-PATHOLOGICAL EXERCISES

EDITED BY
RICHARD C. CABOT, M.D., AND HUGH CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 11341

A BOY of seventeen living in Massachusetts entered December 12. One brother aged nine had joint tuberculosis. His father, mother, eight sisters and three brothers were well. The patient smoked ten cigarettes a day. He had "slow fever" for some weeks at eight years old. There was no history of typhoid fever, rheumatic fever, chorea or sore throat and he denied venereal disease. The history was otherwise negative.

Thirty-five days before admission while pitching hay he suddenly began to have dull, aching, constant pain in the right upper quadrant below the costal margin, severe enough to prevent sleep but not to make him double up or groan, increased by deep breathing, not influenced by food or defecation. He went to bed at once and had remained there. He thought he was at first without fever. Twenty-five days before admission the pain ceased and had not recurred. He had however had constant tenderness on pressure over the outer aspect of the right rectus at the costal margin. He coughed once or twice a day, raising about half a teaspoonful of white sputum without blood daily. There was no dyspnœa or wheezing. His appetite was poor. There was no nausea, vomiting or discomfort after food. Enemas gave good results daily. He had had no chills, but had had two night sweats. There had been no headaches, urinary symptoms, muscle pains, jaundice, vomiting of blood, or blood in the urine or stools. He slept poorly for no special reason. He had lost some weight.

Examination showed a well nourished boy with good coloring. A few glands the size of beans were palpable in the middle of the left cervical region. The neck was not stiff. The heart, lungs and spine were negative. The blood pressure was 145/75. The abdomen was flat, symmetrical, tympanitic, with no shifting dullness. The right side was constantly more rigid than the left, the muscle spasm being more marked in the right upper quadrant with tenderness at the outer border of the rectus at the costal margin. There was slight spasm at the right costo-iliac space. No mass was felt. The liver, spleen and kidneys were not felt. There was no rash. The pupils were equal, regular and reacted. The deep reflexes were normal and there was no Kernig or Babinski. The genitals and rectal examination were negative. The fundi were negative.

The urine and a Wassermann test on the blood were negative. The leucocyte count varied from 8,600 to 17,000, with 79 per cent. polynuclears and 21 per cent. lymphocytes. No malaria organisms are mentioned. Widals were constantly negative. Cultures from the urine and blood were negative. X-ray of the chest was negative. The stools were negative for typhoid or paratyphoid.

The temperature and pulse until January 14 are shown in the chart. After January 14 the chart was normal. The respirations were normal throughout.

January 8 operation was done. The patient did well. The highest temperature after it was comparable with the lowest temperature before. There was considerable drainage. By January 20 the chart was flat. January 26 he was discharged.

DISCUSSION

BY DR. FREDERICK T. LORD

NOTES ON THE HISTORY

The significant features of the story are the onset thirty-five days ago of pain in the right upper quadrant. He had the pain for ten days. This pain is adequately characterized except that no statement is made regarding radiation.

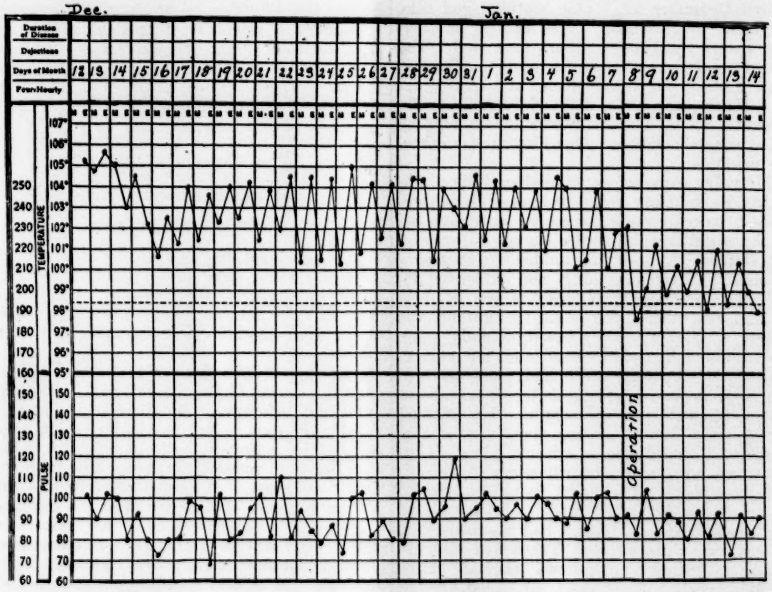
Appropriate questions were asked to determine the source of the disturbance. The only significant information obtained in the attempt to refer the pain to any particular region or organ was its aggravation by long breath, which would seem to relate it to the movements of the right diaphragm. A second important feature is the subsidence of the pain after ten days, the persistence of tenderness over the right rectus at the costal margin, and on examination spasm of the abdominal muscles over the right upper quadrant. A third important point is the persistently elevated temperature and high leucocyte count with increase in the polynuclear cells.

DIFFERENTIAL DIAGNOSIS

We should consider such causes of continued fever without definite localization of the underlying process as miliary tuberculosis, typhus, malaria, syphilis, trichiniasis, malignant endocarditis, typhoid and paratyphoid fever, and such local lesions as perinephritic abscess, subdiaphragmatic abscess, perforated peptic ulcer, renal tuberculosis, malignant disease, suppurative pancreatitis, cholecystitis, and hepatic or subhepatic abscess.

Take the more general causes of continued fever. (1) Miliary tuberculosis. There is a story of joint tuberculosis in the brother, and

the clinical aspects of the case are consistent with miliary tuberculosis. The leucocytosis, which in this case ran as high as 17,000, with seventy-nine per cent. polynuclears, is not inconsistent with our experience with miliary tuberculosis. I have been over the hospital records for this point. In fifty-six cases with complete necropsies—and in this series only those with complete necropsies are considered—the white count was normal or low in nineteen, or 33.9 per cent. It was above normal in thirty-seven (66 per cent.). Meningitis did not appear to influence the white count. Age was more important than any other single factor in influencing the white count. The younger



the patient the more likely is there to be a leucocytosis. The diagnosis of miliary tuberculosis may be made by finding tubercle bacilli in the blood in about two-thirds of the cases.

There are two methods. Ten c.c. of blood is mixed with an equal volume of two per cent. sodium citrate solution, centrifuged, and the sediment inoculated into a guinea pig. The second method is by culture. The blood is hemolyzed by the addition of sterile distilled water, centrifuged, and the sediment smeared on the surface of blood agar. The blood agar slants must be sealed to prevent drying, and if tubercle bacilli are present colonies appear in two to three weeks. Blood cultures were said to be negative in this case, but this statement does not refer to cultures of tubercle bacilli but to other organisms.

There are three important diagnostic features of miliary tuberculosis. Tubercles in the skin are not uncommon in infancy, but are rare in adults. Chorioidal tubercles demonstrable by opthalmoscopic examination are more important, and by this means I have made the diagnosis in three cases within the past three years. The third and most important is the radiographic presence of diffuse fine hazy mottling throughout the lung fields, more numerous in the upper two-thirds.

This is a satisfactory X-ray. There is no respiratory motion. The diaphragm shadows are normal, the costophrenic angles clear, the mediastinum and heart negative, and there is nothing abnormal in the lung fields. In other words it is satisfactory enough to exclude the presence of miliary tubercles in the lung fields.

It is rather interesting, I think, that the diffuse hazy mottled areas which appear in miliary tuberculosis seem to be most numerous in the upper two-thirds. It is probable however that they are evenly distributed, but are blurred beyond recognition in the lower third by the waves of cardiac motion which travel over this region during the short period of exposure. Shadows due to miliary tuberculosis cannot be demonstrated if the films are blurred by respiratory motion, and miliary tuberculosis cannot in consequence be demonstrated in infants and young children. The negative radiogram of the chest in this case excludes miliary tuberculosis. It was taken toward the end of the

period of observation, and three to four weeks is sufficient time for the development of demonstrable tubercles.

DR. LINCOLN DAVIS: It looks more mottled on the left than on the right—that is it does to me.

DR. LORD: There are always a certain number of normal shadows which appear in all lung plates. I do not think there is anything abnormal in this X-ray. There are shadows at both lung roots, but there is nothing in the periphery which indicates anything abnormal in the lung field. It is an important point that these films were taken sufficiently late in the illness so that we can exclude tuberculosis. Dr. Elliott Joslin had a case in which he had an X-ray which was negative with respect to the lung fields, and one month later he had another X-ray which showed miliary tubercles. There was evidence that within a month miliary tubercles developed to such point that we could demonstrate them by X-ray.

(2) Typhus is unlikely from the absence of rash and the duration of the febrile period, which in typhus lasts about two weeks.

(3) This is not malaria. The temperature chart is not that of the ordinary type of malarial fever. It is a continued fever with swings of temperature from 101° to 104° or thereabout, but has not the appearance of ordinary malarial fever as we see it in this part of the country. And the spleen would certainly be enlarged if malaria were the cause.

(4) Syphilis can be excluded by the height and duration of the fever, the absence of cutaneous eruption and the negative Wassermann reaction.

(5) I have seen this clinical picture almost exactly duplicated in trichiniasis, with intense upper abdominal pain in the early period from myositis of the diaphragm, and later a persistent higher fever. But the absence of pains in the muscles of the extremities, the lack of edema of the face, and the absence of eosinophils in the blood are against trichiniasis.

(6) Malignant endocarditis is unlikely from the absence of a history of rheumatic fever or chorea, the failure to establish an endocardial lesion on physical examination, the absence of purpura or other skin lesions, and the negative blood cultures.

(7) Many features suggest typhoid or paratyphoid in this case. Typhoid, though of much diminished incidence, is with us still a common cause of continued fever. The sudden onset with severe right upper quadrant pain which persisted for ten days as the most prominent feature of the early part of the illness is inconsistent however with the usual insidious onset and vague initial manifestations of typhoid. Under observation in the hospital however there was no pain, and the only positive findings were tenderness and spasm in the right upper quadrant. The elevated white count, the negative blood cultures and Widals, the absence of typhoid and paratyphoid bacilli in the stools and of rose spots and enlarged spleen make it improbable that typhoid or paratyphoid is the cause.

Such general infections as those already considered do not account for the pain, spasm and tenderness in the right upper quadrant, and a local process seems a more likely explanation.

(8) Perinephritic abscess is prone to be latent early in its course, and is thus not infrequently a source of difficulty in explaining continued fever. But the absence of posterior costo-iliac pain, tenderness, spasm and swelling eliminates it from serious consideration.

(9) Subdiaphragmatic abscess is to be considered, but there is no suggestion on physical examination of elevation of the right diaphragm. The most important evidence of subdiaphragmatic abscess is obtained by the Roentgen ray, which shows no abrupt dome-like elevation of the diaphragm with convex upper border at the base of the lung, with partial or complete absence of respiratory motion under the fluoroscope. The negative radiogram of the chest in this case is enough to exclude it. He has a right-sided process, but the right diaphragm here is not high, because as a matter of fact it is as high as the left, and the left is ordinarily a little lower than the right.

(10) A perforated gastric or duodenal ulcer with encapsulations of pus under the liver is a possibility, but the absence of symptoms referable to the stomach makes it improbable.

(11) A tuberculous right kidney with involvement of the peritoneum over its upper pole and a blocked ureter, hence the absence of pus or blood in the urine, is a possibility. Renal tuberculosis with completely negative urine is improbable, but the records of the hospital contain one such case, reported by Barney and Young in the BOSTON MEDICAL AND SURGICAL JOURNAL of June 29, 1911.

(12) Malignant disease, especially lymphosarcoma and Hodgkin's disease, are not infrequently accompanied by long continued fever. The absence of any palpable mass by rectal and abdominal examination is against it, but such negative evidence is unreliable. The suddenness of onset makes malignant disease improbable.

(13) With suppurative pancreatitis the onset would be more stormy and the pain referred to the epigastrium and toward the left rather than the right upper quadrant.

(14) Acute suppurative cholecystitis is to be considered, but the patient is young for cholelithiasis, with which it is commonly associated. The introduction of magnesium sulphate solution through the duodenal tube, as in the method of Lyon (*Jour. A. M. A.*, Sept. 27, 1919), and the analysis of the duodenal contents may in such cases furnish evidence of suppuration in the biliary passages by the presence of pus in

the fluid. This test was not done. In the presence of a blocked cystic duct there may be pus in the gall-bladder with a negative test. An X-ray of the gall-bladder would have been desirable, but as the results are often negative in the presence of gall-bladder disease the question of cholecystitis would probably not have been settled by this means. The use of the sodium salt of tetrabromphenolphthalein, as in the method of Graham, Cole and Copher (*J. A. M. A.*, May 31, 1924), is also to be considered. Our experience with this test is not sufficient to warrant an opinion as to its usefulness.

(15) Hepatic abscess is also to be considered. It is usually secondary to such abdominal infection as accompanies appendicitis, cholecystitis with or without gall-stones, perforation of duodenal or gastric ulcer. But it may be primary. Hepatic abscess cannot be excluded.

We are left then, to conclude the diagnosis, with a localized suppurative process in the right upper quadrant as the most likely explanation of the clinical picture. The onset with pain and the later febrile course without pain suggest early peritoneal irritation followed by a walling off of the inflammatory process or its subsidence with secondary involvement of the liver. Suppurative cholecystitis or an abscess in or under the liver would adequately explain the clinical picture.

PRE-OPERATIVE DIAGNOSIS

Abscess of the liver.

OPERATION

Under local infiltration with novocain the posterior inch and a half of the twelfth rib on the right side was resected. A liver abscess was opened and drained extraperitoneally with a large rubber tube. The last half of the operation was conducted under gas and oxygen anesthesia.

FURTHER DISCUSSION

The subsequent events in this case are that the patient was discharged eighteen days after operation. He continued to drain after discharge for nearly eighteen days. He has not been heard from since, as we hoped.

DR. DAVIS: What was the cause of the abscess?

DR. LORD: Culture from the abscess showed staphylococcus. The primary source—I suppose it is to be considered that he might have had an appendix, but the pain is too high to make it very probable.

DR. DAVIS: Don't you think it might have been perinephritic abscess?

DR. LORD: That it started as a perinephric abscess, you mean?

DR. YOUNG: What is your primary focus for that?

DR. LORD: There is nothing in the story to suggest.

DR. DAVIS: The kidney.

DR. YOUNG: A culture of the urine coming from the kidney should show the organism in the urine if the kidney is the primary focus. This did not. Of course it was only one culture, which might have missed it.

LATER NOTES

The hospital to which the patient was discharged reports that he made five visits to the Out-Patient Department, where the wound was dressed. February 18 there was no drainage, and the patient was discharged.

July 24 the boy was seen, and found to be feeling fairly well, but not strong enough to do hard work.

DIAGNOSIS

Liver abscess.

CASE 11342

SURGICAL DEPARTMENT

A FRENCH Canadian of nineteen, a cotton mill operative, was sent from the Emergency Ward April 8 complaining of weakness of the lower extremities. His intelligence was distinctly below normal. He obviously withheld part of his story. His speech was slow and mushy and difficult to understand. He laughed and smiled to himself a great deal. His mother died of shock. Ten brothers and sisters died during childhood. In childhood the patient had a "sore ear." For nine months he had been drinking doubtful liquor and keeping bad company.

In May, eleven months before admission, he noticed unsteadiness of gait and weakness when standing and walking, and also difficulty of vision. The weakness had gradually increased. For the past five months his vision had become more and more disturbed, until at admission he kept his eyes on the ground when walking because if he looked up he became dizzy. He could read only for about ten minutes before the print blurred.

Examination showed a well nourished, undersized boy with a broad flat face and a high palate. The sixth year molars had irregular surfaces. The tonsils were slightly red and large. There was slight general adenopathy. The left hand showed slight intention tremor. The gait was markedly ataxic. He looked at his feet when he walked. He swayed no more with his eyes closed than with them open. The pupils were dilated and reacted very sluggishly. The knee-jerks were hyperactive. The rest of the examination showed no abnormalities.

Before operation the temperature was 96.8° to 99°, the pulse 62 to 92, the respiration normal. The urine was cloudy at two of three examina-

tions, showed the slightest possible trace of albumin at one, occasional leucocytes at another, specific gravity 1.020 to 1.024. The amount was 38 to 80 ounces on the four occasions recorded. The blood was normal. A Wassermann was negative. Lumbar puncture April 9 gave 10 c.c. of clear colorless fluid, initial pressure 138, after withdrawal of 5 c.c. 70, after withdrawal of 5 c.c. more 42, dynamics normal, 6 cells, ammonium

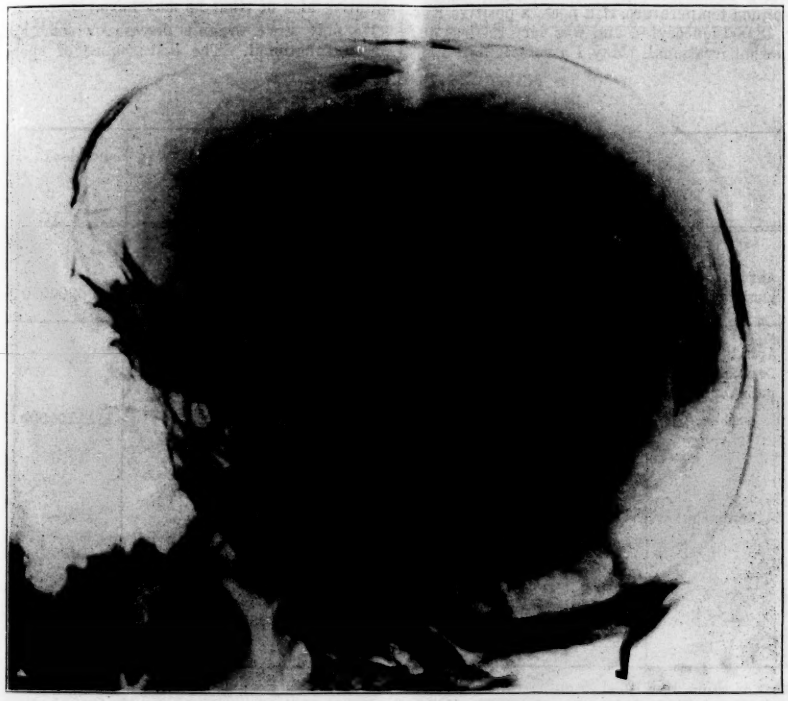


PLATE I. Shows thinning of the skull due to increased intracranial pressure. There is flattening of the sella turcica.

sulphate, alcohol and Wassermann negative, total protein 89, goldsol 0000000000.

X-ray April 13 showed no evidence of abnormality in the pelvis or the dorsolumbar spine. The skull (see Plate I) was thin, prominent in the frontal region and showed rather pronounced convolutional markings. The coronal suture appeared rather indistinct for the age, as though prematurely united. The sella turcica was rather wide and flat. The subsellar space was apparently diminished in depth and the posterior clinoid process and dorsum were somewhat irregular in outline. Plates taken April 15 showed the same characteristics. There was no evidence of abnormality in the pelvis except a rotation of the fifth lumbar on the top of the sacrum. This it was thought might be a postural or a developmental peculiarity. The basal metabolism was —13 per cent., pulse 74. A Bárány test showed no abnormalities except past pointing to the right with the right finger four inches to the left, and to the left with the right finger three inches to the right. The fundi showed slight evidence of subsiding optic neuritis; no definite pressure. A nerve consultant reported, "Slow nystagmoid movements. Pallor of the right disc, temporal side. Absent abdominal reflexes. An inconstant suggestion of Babinski with gait and active tendon reflexes. . . ." Dr. W. Jason Mixter reported, ". . . . I see no reason why he could not be discharged from the hospital to return later if necessary. The other suggestion would be to treat his hysteria and if no progress were made in that way to come back for ventricular studies." Dr. W. H. Smith pointed to loss of abdominal reflexes as a most important bit of evidence.

April 29 the posterior horn of the left ventricle and the lumbar subarachnoid space were

tapped simultaneously. There was found to be an increased pressure in the ventricle and hydrocephalus. The lumbar pressure was considerably lower than the ventricular originally, also following jugular compression and the removal of fluid. (See table.) Pneumoventriculography showed definite evidence of enlargement of the ventricles; no evidence of any tumor mass projecting into them. (See Plate II.)

After the lumbar puncture the patient had continued temperature, stiff neck, a positive Kernig, 18,000 leucocytes, and was very restless and somewhat irrational. May 1 a ventricular puncture was done and 100-125 cubic centimeters of blood tinged fluid obtained under only slightly increased pressure. A culture was sterile. He was given hypertonic saline twice with very little effect.

SPINAL AND VENTRICULAR FLUIDS

	Amount	Character	Pressure		Total cells	Protein	Goldsol
			Initial	Final			
April 9 Lumbar	10 c.c.		138	42	6	89	0000000000
April 29 Combined puncture							
Lumbar		Clear colorless	The ventricular pressure was higher than the lumbar throughout, and on jugular compression there was a prompt rise and fall in the ventricular pressures, while in the lumbar the changes were slow and less marked.			66	1111100000
Ventricular		Slightly blood tinged					

May 3 operation was done. The patient seemed much relieved after it. There was considerable edema about the wound. The temperature ranged from 99° to 103°, the pulse from 92 to 131. He was quite rational. The swelling of the neck came down considerably. Nothing could be found to account for the temperature, which persisted until May 29. The left facial palsy was still quite marked at that time. He did not feel strong enough to walk until the first of June. June 4 the facial palsy was slowly clearing up. June 8 he was discharged, still with general weakness and ataxia with a tendency to fall to the left.

Discussion

BY DR. JOHN S. HODGSON AND DR. FRANK FREMONT-SMITH

NOTES ON THE HISTORY

Dr. Hodgson: So far we have a young man coming in complaining of weakness of the lower extremities, showing a disturbance of speech and some mental changes. We can form only a very tentative idea of what he may have.

He may have organic disease or something partly functional. The disturbance of speech might possibly suggest multiple sclerosis, but it is perhaps too soon to form such an opinion. The unsteadiness of gait, the weakness in standing and walking, and the difficulty in vision suggest possibly the presence of cerebellar disease. These symptoms would also go with multiple sclerosis. The fact that the vision had become more and more disturbed would probably be a little against multiple sclerosis—a gradually progressive disturbance of vision—although it is not absolutely against it. The dizziness could go with either cerebellar disease or multiple sclerosis. So far I should say the symptoms could apply equally well to either of those conditions.

NOTES ON THE PHYSICAL EXAMINATION

The intention tremor of the left hand suggests a multiple sclerosis. The record does not

tell us anything more than that, and there may have been something else present on examination which would have suggested a little more cerebellar disease than multiple sclerosis,—past-pointing, for instance, which is not mentioned.

The hyperactivity of the knee-jerks could go with either cerebellar disease or multiple sclerosis.

I am unable to attach any definite importance to the urinary examination here. I do not think it helps to make a diagnosis of either of the two conditions that I am considering.

At lumbar puncture the initial pressure of 138 was normal and after the withdrawal of five c.c. and five c.c. more it showed what I should consider a fairly normal drop in pressure. The "normal dynamics" simply means that the pulse and respiratory oscillations were normal and that there was a normal rise and fall on jugular compression and release. The six cells would not necessarily mean an abnormal fluid. I think that would be considered about the upper limit.

The total protein of 89 is somewhat elevated, and would be a little against multiple sclerosis. The gold solution showing straight zeros would also be against multiple sclerosis. The high protein in my opinion would go with some cerebellar lesion, and definitely indicates some pathological process in the central nervous system.

In other words, the X-rays of the skull show a definite abnormality which cannot be explained on the basis of a diagnosis of multiple sclerosis alone. It makes me feel that the diagnosis of increased intracranial pressure probably due to some tentorial lesion is the more likely of the two diagnoses. We see in the plate that the sella is rather broad and flat, that the posterior clinoid is flat, and the dorsum sellae is eroded. We can see also a general increase of intracranial pressure.

PLATE II. Ventriculogram showing dilated lateral ventricle outlined by a scratched line on the film.

DR. FRANK FREMONT-SMITH: There is an interesting apparent contradiction here which is of a great deal of importance. We have an X-ray picture showing the typical bony changes of increased intracranial pressure. The original X-ray report was "intracranial pressure due to brain tumor." The X-ray people are pretty conservative and do not make such a statement lightly. On the other hand we have a lumbar pune-

ture with a normal pressure and normal dynamics, proving that the intracranial is not increased. How can we explain these contradictory findings? Is one observation wrong, or is there an explanation which is helpful? Atrophic changes in the skull due to increased intracranial pressure take weeks or even months to develop, and once developed do not disappear for several months at least, even after the pressure has been relieved. An X-ray picture then can tell us that there has been increased pressure in the past. It gives no direct evidence of what is going on at the time the picture is taken. Lumbar puncture, however, gives us the direct pressure reading at the moment of puncture, but tells us nothing in regard to the pressure at an earlier date. In this case, then, we have direct evidence by lumbar puncture of normal intracranial pressure at the present time, but X-ray evidence of increased intracranial pressure at an earlier date. If we will now turn again to the present illness, and particularly to the progression of symptoms, we find the explanation. The following is abstracted from my notes. The onset of his illness was with staggering, headache, dizziness, the headache occasionally accompanied by vomiting and blurring of vision. These symptoms all came on about the same time, eleven months before admission, and I believe indicated a period of increased intracranial pressure and choked discs,—a period during which the bony changes which we see by X-ray occurred. Then came a period of improvement, for the past three or four months, although the staggering progressed, the headache, vomiting and blurring of vision subsided, as well as the choked discs. At this time we do lumbar puncture and find the pressure not elevated. There is then no contradiction—both X-ray and lumbar puncture observations were correct and correspond to the progression of the present illness. The apparent discrepancy in the findings was due to an incomplete history of the present illness.

DR. HODGSON: The evidence of subsiding optic neuritis could mean either a cerebellar lesion or a multiple sclerosis, because we get an optic neuritis occasionally in multiple sclerosis, so that that does not establish the diagnosis.

Nystagmus would go perfectly well with multiple sclerosis, since nystagmus is one of the outstanding symptoms, and temporal pallor is also frequently mentioned.

Absent abdominal reflexes also go with multiple sclerosis. Active tendon reflexes can go with either of these conditions.

Hysteria evidently was being considered as one of the possible diagnoses, but in the presence of nystagmoid movements and changed deep reflexes it seems to me that it is rather unlikely, and of course with the X-ray findings that we have here I think it can be ruled out, at least as a major diagnosis. There may be some hysteria present, but that was not the whole trouble.

DR. FRANK FREMONT-SMITH: I think it may be of interest to read a few of the various consultation notes directly from the record to show what diagnoses were considered by the various physicians who examined this patient. They all had the evidence of this X-ray picture and also the conflicting evidence of the lumbar puncture, also the final report that there was the possibility of a subsiding neuritis. One man says, "The condition suggests three possibilities, (1) cerebellar tumor, (2) hysteria, (3) glandular deficiency with mental deficiency."

A second consultant: "Inconstant suggestion of Babinski with gait and active tendon reflexes; therefore a provisional diagnosis of multiple sclerosis in a hypophrenic boy with endocrin unbalance."

A third: "On more careful examination I agree with the above diagnosis of multiple sclerosis."

A fourth: "With the possibility of cerebellar involvement, suggest consultation with neurosurgeon."

The neurosurgeon gives the following: "I feel that this case suggests hysteria or multiple sclerosis much more than tumor. Would advise against operation, though it may be advisable later."

One more consultant: "Between hysteria and multiple sclerosis I cannot differentiate. I think the most important bit of evidence in favor of multiple sclerosis is the loss of abdominal reflexes. I am inclined towards sclerosis."

That was the argument that was in progress. We felt very strongly that this X-ray picture (see Plate I) could not be discounted. I will read the summary of our physical examination, which is a little different from that given here. "Discs pale, with sharply irregular margins suggesting secondary atrophy (secondary to a subsiding choked disc). Marked ataxia of the lower limbs; moderate adiadokokinesis, which means that the patient if asked to extend his arms and rapidly pronate and supinate them could not keep the arms synchronous. Then hyperactive knee-jerks. The findings that we had all pointed to a disturbance of the cerebellum or cerebellar tracts. We had X-ray evidence of past increased intracranial pressure and a history suggesting increased intracranial pressure eleven months ago, and on that basis we were rather insistent that the patient should not be allowed to go home without further investigative procedures. Finally permission was given for combined lumbar and ventricular puncture to find out whether internal hydrocephalus or block between ventricle and lumbar region existed.

DR. HODGSON: The report of the combined puncture is perhaps the strongest evidence we have so far in favor of the diagnosis of cere-

bellar lesion; the presence of hydrocephalus and the evidence of partial block between the ventricle and the lumbar region as shown by differences of pressure in the two fluids before and during jugular compression. The increased pressure was probably due to the anesthesia. Ether regularly raises the cerebrospinal fluid pressure. Air was injected into the ventricle at the close of the procedure.

The first X-ray plate shows the fluid level and the lateral ventricles on both sides, which are dilated.

In the second plate the patient is on the back of his head, showing definitely dilated frontal horns.

The third picture shows the other frontal horn dilated to at least twice the normal size.

The fourth (see Plate II) is another lateral view which is a little hard to see, but there is a shadow showing a greatly dilated lateral ventricle on that side.

DR. FREMONT-SMITH: Now we can perhaps feel a little differently about the statements that the boy had a "poor mentality," that he was "uncoöperative." I think the answer was that the boy had a good part of his brain destroyed by hydrocephalus rather than any unwillingness to tell his story.

The protein in the ventricular fluid was 23 mgm. per 100 c.c., while in the lumbar it was 66 mgm. This is a definite increase in the lumbar region and is consistent with the finding of partial dynamic block between lumbar and ventricular fluids. These findings together with well marked bilateral internal hydrocephalus as shown by the ventriculograms are strong evidence for a posterior fossa lesion.

X-RAY INTERPRETATION

The general appearances in the cranium are suggestive of intracranial pressure from tumor.

DR. HODGSON'S PRE-OPERATIVE DIAGNOSIS

PRE-OPERATIVE DIAGNOSIS

Cerebellar tumor.

OPERATION

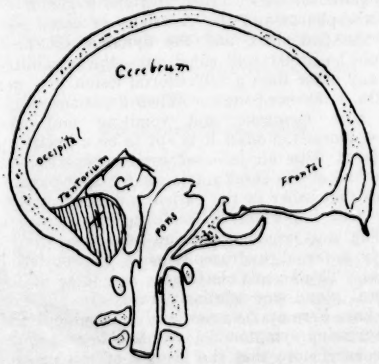
Ether. Cerebellar incision. A small trephine opening was made on the right side and an attempt made to tap the posterior horn of the right lateral ventricle, but the ventricle was not reached. The usual crossbow incision for a cerebellar exploration was then made. The dura overlying the cerebellar region was very tense and bluish looking throughout. It was incised, permitting the escape of 250 to 300 c.c. of clear straw-colored fluid which came from both sides of the median line and presumably came from an arachnoid cyst. The arachnoid was closely adherent to the dura. Both lobes of the cerebellum were very greatly compressed from the pressure of fluid so that the cerebellum was a very small organ, and instead of projecting into the posterior fossa was a small concave organ symmetrically compressed on the two sides. Posteriorly and peripherally it was flattened out almost as thin as paper. The wall of the cyst was considered to be arachnoid. This could be separated from the dura in places and a portion of it was removed for microscopic study. Following the evacuation of the cystic fluid the cerebellum could be carefully examined and the vermis was identified as well as both hemispheres. What was considered the cisterna magna was found with intact walls. It could not be told positively whether this was cistern or fourth ventricle, but it was considered to be the former. A window was cut in the suspected cistern permitting the escape of normal looking cerebrospinal fluid. The wall of the cistern and some of the contained fluid were saved for examination. The purpose of cutting a window into the cistern was to permit the drainage of any further fluid which might accumulate within the walls of the evacuated cyst. The walls of the cyst were then treated with Zenker's solution and the wound closed as usual in layers without drainage.

PATHOLOGICAL REPORT

Microscopic examination of small fragments shows fibrous tissue suggesting the structure of the meninges and containing hyalin degenerated blood vessels and areas of old hemorrhage. The histologic examination is not inconsistent with meningitis serosa circumscripta.

FURTHER DISCUSSION

DR. FREMONT-SMITH: Here is a diagram which shows the cyst, marked "X" and shaded.



C, cerebellum, compressed by cyst.
X, shaded area, location of cyst.

It lies below the tentorium between the cerebellum and the occipital bone. The cerebellum, marked "C," is much compressed by the cyst.

DR. HODGSON: It seems to me that from the

history as given up to the point where the X-rays were taken one would be very much inclined to the diagnosis of multiple sclerosis, but after the X-rays, and if one knew that a more detailed history brought out other facts, the diagnosis of a cerebellar lesion was the more likely. Following the lumbar puncture there seemed to be no question in our minds but that that was the diagnosis.

It was a very unusual case. I have seen none like it before. Since then we have had one other very similar.* This boy went out of the hospital very much relieved.

DR. FREMONT-SMITH: It is perhaps now on reviewing the story possible to see how a cyst not associated with a tumor can explain these symptoms. There was a period when the cyst was under increased tension causing the period of choked disc, headache, vomiting and atrophy of the skull. Later, the fluid no longer accumulating in the cyst, the hydrocephalus having occurred but the pressure no longer being high.

MISS PAINTER: Was there a change in the mental condition after operation?

DR. HODGSON: No, there was not much. We did not have him here long enough to be able to tell much about that.

DR. CABOT: I should like to ask whether besides the things considered here it would not be reasonable to consider brain tumor other than of the cerebellum. It seems to me I have recollection of a number of tumors diagnosed as cerebellar which turned out not to be cerebellar but cerebral. So that one ought to have considered not only multiple sclerosis and cerebellar tumor but cerebral tumor.

DR. HODGSON: Yes, I think we should take into consideration a tumor elsewhere than in the posterior fossa. But with the evidence of hydrocephalus and the ventricles of equal size on the two sides, and the dynamic block, it would be pretty well ruled out,—the possibility of any other than a subtentorial lesion.

DR. FREMONT-SMITH: When a patient starts in with headache and vomiting and loss of vision at the onset it is apt to be a lesion associated with an internal hydrocephalus. He also had at the onset ataxia, and it is the symptoms that usher in the patient's difficulties that are most important in localizing brain tumors.

The most common location of tumors giving early internal hydrocephalus is the posterior fossa. Third ventricle tumors and those of the pineal gland are relatively rare. In addition we have here ataxia as an early, prominent and progressing symptom. I should like to emphasize once more that the history of the present illness—the onset and progression of symptoms—is of utmost importance.

DIAGNOSIS

Cerebellar subarachnoid cyst.

*Case 11382, to appear September 17, 1925.

CASE 11343

A NEW ENGLANDER of eighty was referred from the Emergency Ward March 4. The history was difficult to obtain because of his age and slow and indistinct speech, due to lack of teeth and hemiplegia. His daughter was unable to add much.

He had been in good health except for hemiplegia until five days before admission, when he began to have intermittent cramp-like pains in the region of the umbilicus, rather generalized. Since that time he had had no normal bowel movement and for three days had retained nothing except a little gruel the afternoon of admission. Once he had vomited some coffee ground material, possibly stercoraceous. An enema the morning of admission gave no result and one in the evening in the Emergency Ward gave very poor result. Upon admission to the ward he was not having much pain.

Examination showed a fairly well nourished old man with a stercoraceous odor to the breath. There were no teeth. The upper chest was full of scattered dry râles front and back. The heart was normal. The blood pressure was 150/75. The abdomen above the umbilicus was slightly distended with gas which could be felt gurgling. There was possible slight tenderness to the right of the umbilicus. Motion of the right arm and leg was limited from the old hemiplegia. The knee-jerks were not obtained.

Before operation the temperature was 101° by rectum, the leucocytes 13,400, the urine showed a rare hyalin cast and occasional leucocytes.

The day of admission operation was done. The patient was in poor condition after it. There was no drainage. The distension was not relieved. March 5 he died.

DISCUSSION

BY DR. EDWARD L. YOUNG, JR.

Was the hemiplegia an old process, so far as the history goes?

MISS PAINTER: Yes.

DR. YOUNG: This brings up the question of intestinal obstruction. We have not had a case for some time. Of course the first thing to do is to emphasize the need of early diagnosis, because the mortality of acute intestinal obstruction is in the neighborhood of fifty per cent., and when we go over the records it seems as if a large part of the mortality was due to the late diagnosis.

There are varying types of intestinal obstruction, some of which are extremely puzzling. If an obstruction involves interference with the blood supply of the bowel so that there is strangulation, as in strangulated hernia or volvulus, the symptoms are severe from the onset, and with that type of case it seems as if the diagno-

sis should be made early because of the severity of the symptoms; or at least it seems as though the severity of the symptoms should drive the patient to the doctor and the doctor to immediate examination.

On the other hand there is a type due to a band which causes obstruction without strangulation, as for instance one that I saw last week, where the man had had similar attacks for years. He was a man of thirty and thought he had had them as a child. He had always got over them. He did not vomit at first. There was pain and his bowels did not move. It was only after two days during which he refused surgical interference that there was any change which would suggest anything serious; that is, he had a pulse between seventy and seventy-four, normal temperature, no distension, vomiting perhaps once in twenty-four hours, but abdominal pain. Operation, to which he then consented, showed a Meckel's diverticulum acting as a soft band causing obstruction to the lower ileum. There was no strangulation; the bowel had not been damaged. Operation was done in plenty of time to give him a perfectly normal convalescence. If that same diverticulum had acted as a band through which a loop of gut had become strangulated his immediate symptoms would have been of such severity that there should have been no question at all of diagnosis.

Here is a man who from the story had those severe symptoms at once, and it would seem as though some investigation should have been started early.

I think we ought to make a list of these odors. This is the fourth. We have the "cholemic," the "acetone," the "uremic" and the "stercoraceous" odor. I should like to offer them to men in separate bottles not labeled and see if they would get them. Undoubtedly there was an abnormal odor that could be detected. When I was house officer we used to speak of the "Allen Street* odor."

There is one other point here which I would like to comment on. That is, the abdomen above the umbilicus was slightly distended. It has been stated that the position of distension of the abdomen will help one to localize the point of obstruction. I do not believe that is true, because the distension will be above the point of obstruction and will be of course in loops of the small bowel, and the small bowel can be anywhere in the abdomen. So that I do not believe the position of distension helps localize obstruction. On the other hand if a patient will state that here or here he can feel gas gurgle, or we can on examination hear a marked gurgling over any part of the abdomen, I think that is fair to use as a point of localization of obstruction.

Of course the gross diagnosis is abdominal obstruction. There is nothing in the story as given, nothing in the examination as given, to suggest that that is due to one thing or another. At his age, coming on out of a clear sky, we always think of carcinoma, and that, on the theory of chances, is in the large bowel somewhere. His vomiting did start at once and with obstruction in the bowel from carcinoma the vomiting is apt to be delayed. The cramp-like pain might go with that. It may be due to any one of the other causes of intestinal obstruction of mechanical nature, volvulus band, an internal hernia. Or at this age we must always remember that acute appendicitis is apt to be grossly atypical, and it may be an acute appendix which has come on in this fashion. We are not told anything about his pulse. I think that is always important. With acute intestinal obstruction the pulse will as a rule be normal from a few hours to two or three days and then start climbing upward. When it starts climbing upward the danger-point to the patient has been reached and often passed.

Miss Painter: According to the chart the morning of operation it was 100, in the evening 110.

Dr. Young: The abdominal examination does not help us much. The slight tenderness is conceivably due to the appendix, because we often do see in elderly people no tenderness and no spasm in spite of suppurating appendix. So I think all we can say is intestinal obstruction, cause unknown, and it seems to me at his age, with three days' symptoms, the only thing that is at all fair to him is to make an opening in his abdomen under local anesthesia, with as little disturbance in the abdomen as possible, pick up a distended loop of bowel as low as possible, and give him drainage. Then if he will pick up, later any secondary operation that is necessary can be done. But I believe that to do anything more to this man would be poor surgery.

DR. YOUNG'S PRE-OPERATIVE DIAGNOSIS

Intestinal obstruction.

PRE-OPERATIVE DIAGNOSIS

Intestinal obstruction.
Carcinoma of the cecum?

OPERATION

Under scopolamin-morphin anesthesia a four inch oblique incision was made in the right lower quadrant and the peritoneum opened with the escape of considerable serum. The presenting loops of ileum and cecum were rather distended and infected. The appendix was normal. Gas-oxygen was given to explore the abdomen. The ascending colon and hepatic flexure, the descending colon and the sigmoid flexure were filled with hard masses of feces about the size of a thumb top. These were especially matted together in the ascending colon. The left end of the left half of the transverse colon and splenic flexure were not

*The hospital morgue is on Allen Street.

palpated with certainty, as the patient was straining considerably. No tumor mass could be felt. A tube was placed in the cecum by the Kader method and the wound closed in layers without drainage. The patient was sent to the ward in as good condition as before operation.

Further Discussion

They are making the same diagnosis, only using the carcinoma story a little more strongly and putting down carcinoma as the cause of the obstruction.

As I said before, I think this record should have stopped after "the appendix was normal" and said, "the cecum was brought into the wound, the patient sent back to the ward for drainage." Because they have the cecum. It is distended. Therefore it is above the obstruction. He is in too poor shape to go any further, and if he should pick up they have at least a live man to try a second operation on.

I think we have to leave it to Dr. Richardson to tell us what the story is.

A Physician: Where do you generally operate in such a case?

Dr. Young: Below the umbilicus and in the middle line. They believed that it was carcinoma of the cecum, so they went to the right of the middle line. But if we are in doubt we can reach more of the probable things through a midline incision below the umbilicus than anywhere else.

Clinical Diagnosis (from hospital record)

Intestinal obstruction.
Terminal pneumonia.
Cecostomy.

Dr. Edward L. Young's Diagnosis

Intestinal obstruction.

Anatomical Diagnosis

1. *Primary fatal lesions*

Arteriosclerosis.
Arteriosclerotic occlusion of minute branches of the superior mesenteric artery leading to a small strip of the ileum, with hemorrhagic infarction of this portion of the intestine.

2. *Secondary or terminal lesions*

Arteriosclerotic occlusion of minute branches of the splenic artery in the splenic substance, with infarcts.
Arteriosclerotic atrophy of the right coronary artery with compensatory increase of the left coronary artery.
Edema of the lungs.

3. *Historical landmarks*

Operation wound.
Foci of obsolete tuberculosis of the bronchial glands and the left lung.
Slight chronic adhesive pericarditis.
Slight hypertrophy of the prostate.

Dr. Richardson: We were not permitted to examine the head.

A tube extended from the operation wound into the cecum, in the wall of which it was sutured. In the peritoneal cavity there was a small amount of thin bloody fluid, sufficient blood to be accounted for. The intestines were negative except at a point about 100 cm. above the ileocecal valve, where there was a strip of intestine thirteen cm. long the walls of which were infiltrated with purplish-brownish-red bloody fluid. On section the mucosa was thickened, reddened, and infiltrated with bloody fluid. There was a little bloody fluid in the lumen of the tube. This condition ceased abruptly at the lower and upper margins. There was a V-shaped piece of mesentery leading to this strip, and in the margin of the mesenteric insertion the minute and distant branches of the superior mesenteric artery showed arteriosclerotic occlusion, producing of course hemorrhagic infarction in that portion of the intestine. This was the source of blood in the peritoneal cavity.

The bronchial glands showed some obsolete tuberculosis. The lungs were negative except for considerable edema of the lower lobes.

In the pericardium was a band of old adhesions extending between the visceral and parietal layers. The heart weighed 349 grams, not hypertrophied, a good-sized heart for him. The myocardium was of good consistence, brown-red, and macroscopically and microscopically showed no myocarditis. This is important, as we shall see. The valve measurements: mitral 10 cm., aortic 7.5 cm., tricuspid 12.5 cm., pulmonic 8 cm. (Normally mitral 10, aortic 7, tricuspid 12-13, pulmonic 8-9.) The valves showed a moderate amount of the usual sclerosis associated with the age, but were otherwise frankly negative. The right coronary artery came off the wall of the aorta as usual, but its orifice was very minute. The artery itself presented as a fibrous cord. In this cord the lumen was indistinct. In one or two places we could see a slight indication of it. So that this man's right coronary artery was practically functionless. The left coronary artery however showed marked compensatory hypertrophy; it was nearly as large as the little finger. The circumflex was also hypertrophied. They showed some sclerosis, but were very large tubes and apparently supplied blood enough for the myocardium, as there was no evidence macroscopically or microscopically of myocarditis,—a unique heart.

The aorta and great branches showed well marked arteriosclerosis, fibrous and fibrocalcareous. There were no thrombi anywhere.

Of course with thrombi on the wall of the aorta above the superior mesenteric artery it might be that bits of them had swept into the superior mesenteric artery and caused the infarction mentioned there. But there were no thrombi.

The liver was small, 835 grams, (normally 1200-2400,) but other than for its smallness was negative. That is a weight to remember—835 grams and negative.

A SURGEON: Do old people have small livers?

DR. RICHARDSON: They are apt to have rather small ones as a general rule. Of course our next case might have a big liver.

The spleen weighed 120 grams, (normally 80-180,) with smooth surfaces, prominent trabeculae, and in several places small frank infarcts, and leading to these were arteriosclerotic occluded minute branches of the splenic artery.

The kidneys weighed 220 grams—rather small. (Normally 200-400 grams.) They were negative. The cut ends of the vessels showed no especial prominence, that is no particular sclerosis of the vessels.

The bladder showed slight hypertrophy of the trabeculae but was otherwise negative. The lateral lobes of the prostate were slightly enlarged, and there was slight enlargement of the so-called middle lobe, but with no very definite obstruction of the urethra, but sufficient apparently to produce the slight hypertrophy of the bladder trabeculae.

A PHYSICIAN: Was the intestine distended above that lesion?

DR. RICHARDSON: There was no particular distension.

A PHYSICIAN: Why was it distended below it?

DR. RICHARDSON: Of course they had operated and drained this intestine.

DR. CABOT: That was paralytic distension, wasn't it?

DR. RICHARDSON: I think that was not a complete obstruction. It was paralytic.

DR. YOUNG: How much was the blood in the abdominal cavity?

DR. RICHARDSON: It was a little more than could be accounted for by operation.

DR. YOUNG: How much bloody material was inside the gut?

DR. RICHARDSON: Only in that immediate portion.

DR. YOUNG: This comes in the class of mesenteric thrombus, and from the few we have seen I begin to think the symptoms may be so varied that there is nothing characteristic.

DR. CABOT: This idea of the compensatory hypertrophy of the coronary arteries gives me a good deal of shock. Have you had other cases?

DR. RICHARDSON: Never such a startling case.

DR. CABOT: Do you believe that this big coronary was not born so big, but had stretched to compensate that blood? That is extraordinary.

DR. RICHARDSON: It is like those cases of one very small kidney and one very large one which probably had that relation in the beginning, but which disproportion in the battle for life has been intensified and called compensatory hypertrophy.

PLAN HUGE MEDICAL CENTRE

UNIVERSITY OF PITTSBURGH OFFICIALS ANNOUNCE $14,000,000 PROJECT

PLANS to erect a $14,000,000 medical centre at the University of Pittsburgh to rank with the foremost in the world, are announced by the university's medical committee.

Agreements have been perfected, it was stated, to include the Presbyterian, Children's, Elizabeth Steele Magee, Montifiore and the Eye and Ear Hospitals in a group to be operated in conjunction with the university's fifty-two-story Cathedral of Learning. In connection with this centralized group the school expects to conduct a $2,000,000 medical unit.

The plan will be financed by the hospitals joining the unit, most of which have plans under way for new buildings.

The five institutions will have a capacity of 1,350 beds, said to surpass the capacity of any present group and equaled only by a similar plan of amalgamation of the Presbyterian Hospital of New York City with the Medical School of Columbia University now under way.—*N. Y. Times.*

CORNERSTONE LAID FOR NEW REHABILITATION CENTER

THE cornerstone of the Potts Memorial Hospital, one of the first institutions in the United States to be devoted to the industrial rehabilitation of tuberculous as well as to their treatment, was laid on June 26, at Livingston, N. Y.

The new hospital is in a sense an industrial experiment station for those who have been handicapped by tuberculosis. To it a man may bring his wife and children while he is "taking the cure" and enjoy a normal home life which is to be governed, however, by his own peculiar needs as an invalid. He will also learn to support himself in a congenial occupation that will not overtax his strength. If he is able to earn sufficient money to support his family, the opportunity to do so will be given him. If not, every effort will be made to find agreeable employment in the institution for them. So long as he is unable to support himself alone, a $1,000,000 endowment fund is available to make up the difference between his earning capacity and his necessary expenses. —*Bulletin N. T. Association.*

THE BOSTON
Medical and Surgical Journal

Established in 1828

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HEALTH EDUCATION

Under this caption *The Ohio State Medical Journal*, Volume XXI, No. 8, Page 555, publishes a criticism of the publicity campaign inaugurated by the Massachusetts General Hospital as follows:

"Health Education as a means of keeping the public informed about the fundamental principles underlying disease has been undertaken by the Massachusetts General Hospital.

"Whether the purpose of this campaign is to place uninformed persons upon their guard against unqualified practitioners and nostrums, or to focus their attention upon the worth of keeping physically fit, is not stated. Perhaps the objective includes both.

"This new service was recently announced through the Boston Medical and Surgical Journal.

" 'The Massachusetts General Hospital,' the Journal announces, 'has taken a step that is perhaps unique for a general hospital by instituting a real campaign for the education of the public along health lines. This health course consists of the periodical publication in the daily press of complete and authoritative articles by members of the staff dealing with matters of general and common interest. These articles appear, and will continue to appear, weekly in prominent Boston newspapers. Five have already been published, dealing with body mechanics, hay fever, asthma, varicose veins, basal metabolism, and rickets. The hospital is to be congratulated on having taken the initiative in such an important field of usefulness.'

"Again it seems to us that this important work is and properly should be one of the chief functions of the constituted health authorities. Hospitals and hospital staffs, however conscientious and well-meaning, cannot undertake an educational campaign without arousing some feeling among the laity that it is being done either for self-exploitation, or for advertising purposes.

"Health officials do not have services to sell. They have been selected to look after the public health, through educational methods and sanitary and quarantine regulations.

"How much greater prestige health authorities could acquire by keeping the people of their community informed of the dangers of trusting their physical well-being to unqualified persons and to patent preparations of no therapeutic value.

"An informed community — one that is aware of the kind of medical service it should have and one that well knows the fallacies of cultism and the hazards of nostrums — will naturally mean a community of low morbidity and mortality rates. After all, that is the ultimate goal of preventive medicine and the work of health departments.

"We are convinced that when some health authority does take up this work; when he rolls up his sleeves and goes after the cults and nostrums with a vigor that resounds throughout his community, there will be a marked decrease in the morbidity and mortality rates, then a rapid drop. The result will also mean an individual with a nation-wide reputation."

This criticism is interesting both because the attack reflects the attitude of this influential *Journal* and also because this plan has been favorably considered by other organizations and committees. Here in New England there is a strong sentiment in support of a movement to carry a conservative message to the laity with respect to the things which people should know about themselves and not leave the field to the advertising quacks and cults.

The implied criticism that the public health authorities have not met or may not meet the needs of the people is not well taken so far as the officials of New England are concerned, for there is a constant stream of literature being sent to the people of New England relating to health problems and in addition meetings are held to which the public is invited and given opportunities to hear addresses on important health topics. With all this, however, there are always gaps to be filled and volunteers who are qualified and are endorsed by honorable institutions in which the public has confidence may, we believe, join the campaigns prosecuted by the authorities. Health officials do not carry weight with some people, because there are those who look upon public servants as hirelings.

Voluntary sound advice has at times appeared to have some weight because its value is not measured by dollars and cents.

It may be that we understand the psychology of our citizens quite as well as our neighbors of the middle west.

The subject seemed to our Staff of enough importance to learn how it is considered by our Commissioner of Health and the Journal is pleased at having a letter from Dr. Kelley, from which the following is taken, and which will, we are sure, interest our readers:

"With the enormous volume of publicity being put out in all forms by the pseudo medical cults and proprietary drug houses, it has seemed to me for a considerable time that the public had a right to demand that sound medicine bestir itself, and tell them with equal vehemence what can honestly be accomplished.

"This cannot of course be done by individual physicians because of the obvious criticism of commercialism. On the other hand, universities, institutions, medical societies, official health organizations, etc., should, I feel, all take part in furnishing the public this information. It is unfortunately always easier to find fault with the details of something which is being done than to suggest a better way of doing it. For this reason I feel that the Massachusetts General Hospital, thru its newspaper publicity, is doing an admirable piece of work very well, and I should like to see other sound medical groups follow its example.

Yours truly,

EUGENE R. KELLEY,
Commissioner of Public Health."

THE INFLUENCE OF EPIDEMICS ON BUSINESS

THE public is being treated to philippics with respect to the damage to business caused by the activities of public health agencies in efforts to control or prevent epidemics of disease. It has been alleged that warnings published by authorities and recommendations for more general vaccination, for example, have caused hysteria and damaged business. It is felt by some that smallpox is a much less serious menace to business than general vaccination, although smallpox, according to history, is dangerous to life, may have disabling sequelae and its control involves the expenditure of relatively large sums of money and disturbs business in proportion to the extent of an epidemic.

Those who believe in the application of science to the control of disease will find comfort in the position taken by Professor Charles Hodges of New York who states in an article in the World Health Number of the *League of Nations News* that,

"Public Health is the physical foundation of world-wide commercial intercourse." "Disease is a costly direct and indirect burden upon international trade, finance and industry. It can close markets, blockade sources of supply and change trade routes, with all the economic stagnation the situation implies. The health work of the League of Nations is in line with the more scientific control of international factors bearing upon present-day business.

"The United States is not more than thirty days from bubonic plague, cholera, yellow fever and the other endemic diseases of the world's cesspools. Commerce itself would languish while our prosperty—indeed our necessities in the way of raw products for our world-dependent industries—would disappear if anything like the old medieval sweep of disease ravaged our great work of nations as it shook Europe in the Middle Ages.

"Every ship operator fears what lies behind the yellow flag of quarantine; and merchants, bankers, and manufacturers understand how important it is that we should guard our health at our gates to world intercourse. But so long as vast parts of the earth remained outside the march of progress it had to be a national affair with narrow horizons of watchfulness."

Because his illustrations did not include smallpox by name it may be contended that the medical profession is assuming too much in its concern over the more definitely domestic problem of smallpox in disrupting business but without vaccination smallpox would become again a great devastating epidemic. The people have known that vaccination is a personal responsibiilty to a considerable extent and would endorse its application under stress, but the management of disease referred to by Professor Hodges is now largely an academic consideration among our people made thus by the efficiency of National Health Officials for in them we place our trust. Smallpox would become a matter of interest only to the historian if everybody would be vaccinated and revaccinated at proper intervals. The direct control is within the power of the people.

For the sake of material prosperity, if for no other reason, this domestic responsibility should be carried by the individual.

THE CURE OF SNAKE BITE

A SURVEY of the deaths due to snake bite in this country showed that every year about one hundred persons have died from this cause. The most effective treatment consists in the injection of an appropriate serum.

Mr. Ditmars, curator of reptiles in the Bronx Zoo, states in the *New York Times* that we have no good source of this curative serum in this country although there seems to be a popular impression that the Zoölogical Gardens are equipped to supply this product. Every year thousands of letters are received asking for the serum or for information as to where it may be obtained. At the present time a supply of serum for the treatment of bites by South American snakes is available but that has been found to be of little value in treating the lesions caused by our rattlesnakes.

Mr. Ditmars is about to journey to South America with snake venom from our snakes to be used by the Brazilian Government Institutions for the production of the appropriate serum to antagonize the venom of our rattlesnakes. Dr. Vitali of Brazil is the head of one of these institutions which will coöperate with Dr. Ditmars. When the serum is prepared it will be imported by L. M. Cowdrey, 30 Church Street, New York City, from whom it may be obtained. The process of manufacture is similar to that in use in the production of diphtheria antitoxin except that cows are used instead of horses.

THIS WEEK'S ISSUE

Contains articles by the Following Authors:

DANFORTH, WILLIAM C., M.D., of Evanston, Illinois. Associate Professor of Gynecology in Northwestern University Medical School, Chicago; Member of the American and the Chicago Gynecological Societies and the American College of Surgeons. His subject is "Care of Pregnancy."

WILSON, PHILIP D., M.D., Harvard, is a Fellow of the American College of Surgeons and of the American Orthopedic Association. He is Instructor in Orthopedic Surgery, Harvard Medical School and Assistant Visiting Surgeon, Massachusetts General Hospital. He writes on "Joint Fractures."

MUDD, SEELEY G., M.D., has a continuation of his studies on "Clinical Spirography." He is House Officer at the Massachusetts General Hospital.

MISCELLANY

COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

CLINICS FOR TREATMENT OF VENEREAL DISEASE IN MASSACHUSETTS

CLINICS, OFFICIALS AND HOURS

Attleboro

Sturdy Memorial Hospital, 211 Park St.; Dr. E. S. Ward, Clinic Chief—Tues., Fri., 5-7 P. M.

Boston

Boston City Hospital, 818 Harrison Ave. — Syph.: Tues., Thurs., Sat., 8:30-10:30 A. M. Gon.: Women, Tues., Thurs., Sat., 8:30-10:30 A. M.; men, daily, 8:30-10:30 A. M.

Boston Dispensary, 25 Bennet St.—Syph.: Men and women, Mon., Thurs., Sat., 8:45-1 P. M.; Mon., Wed., Fri., 6-9 P. M. Gon.: Men, daily, 9-10:30 A. M., Mon., Wed., Fri., 6-8 P. M.; women, Tues., Fri., 8:45-10:30 A. M., Mon., Fri., 6-8 P. M.

Carney Hospital, O.-P. Skin Dept., 140 Dorchester St., South Boston—Tues., Thurs., Sat., 9-12 M.

Children's Hospital, 300 Longwood Ave. — Fri., 9-1 P. M.

Massachusetts General Hospital, Fruit St. — Daily, 8:30-10 A. M.

Massachusetts Homeopathic Hospital, 82 East Concord St. (Women Physicians)—Syph.: Mon., Fri., 8:30-11 A. M., Tues, 5-7:30 P. M. Gon.: Mon., Wed., Fri., 9:30-10:30 A. M., Tues., 5-7:30 P. M.

New England Hospital for Women and Children, Dimock St., Roxbury—Daily, 9 A. M. Syph.: Fri., 11 A. M.

Peter Bent Brigham Hospital, 721 Huntington Ave.—Tues., 9 A. M.

Brockton

Brockton Hospital, 680 Center St.; Dr. G. A. Buckley, Clinic Chief—Tues., Fri., 7 P. M.; mornings by appointment.

Cambridge

Cambridge City Hospital, 1483 Cambridge St.; Dr. Walter Garfield, Clinic Chief—Fri., 9-10 A. M.

Fall River

Board of Health Clinic, City Hall Annex, Third St.; Dr. O. E. Boivin, Clinic Chief—Mon., Wed., Fri., 7:30-9:30 P. M.

Union Hospital, 538 Propect St.—Mon., Thurs., 9:30 A. M.

Haverhill

Board of Health Clinic, 6 Court St.; Dr. Frank H. Coffin, Clinic Chief—Tues., Thurs., 12-1 P. M. and 8-9 P. M.

Holyoke

Holyoke City Hospital, Beech St.; Dr. John J. Carroll, Clinic Chief—Men, Mon., 7-9:30 P. M.; women, Thurs., 4:30-7 P. M.

Lawrence

Board of Health Clinic, 130 Oak St.; Dr. J. J. McArdle, Clinic Chief—Mon., Thurs., 9-10 A. M., Tues., Fri., 9 A. M.-5 P. M., Wed., Sat., 9-12 M.

Lowell

Board of Health Clinic, City Hall; Dr. H. L. Leland, Clinic Chief—Men, Tues., 8:30 A. M., Fri., 6:30 P. M.; women, Tues., 6:30 P. M., Fri., 9:30 A. M.

Lynn

Board of Health Clinic, Lynn Hospital; Dr. M. R. Donovan, Clinic Chief—Tues., Fri., 9:30 A. M. and 6:30 P. M.

New Bedford

Board of Health Clinic, 519 Olympia Building; Dr. A. H. Mandell, Clinic Chief—Mon., Tues., Thurs., Fri., 4-6 P. M.

Pittsfield

House of Mercy Hospital, 741 North St.—Tues., Fri., 11-12 M.

Quincy

Board of Health Clinic, Quincy Dispensary, High School Ave.; Dr. E. E. Smith, Clinic Chief—Sat., 3-4 P. M.

Salem

Salem Hospital, 81 Highland Ave.—Tues., 3-4 P. M., Fri., 7-8 P. M.

Springfield

Springfield Hospital, 795 Chestnut St.; Dr. E. C. Sullivan, Clinic Chief—Men, Tues., 5-6 P. M.; women, Thurs., 5-6 P. M.

Worcester

Worcester City Hospital, 71 Jacques Ave.—Daily, 9-10:30 A. M., Wed., 6:30 P. M.

Memorial Hospital, 19 Belmont St. — Syph.: Mon., Thurs., 9 A. M. Gon.: Women, Mon., Wed., Sat., 10 A. M.

CHLORINE GAS IN THE TREATMENT OF RESPIRATORY DISEASES

DR. ALFRED H. BRAECKLEIN of Baltimore reports favorably on the use of chlorine gas in respiratory affections and endorses the conclusions of Vedder and Sawyer. He lays down the following conditions which he feels are essential to success:—

"1. The patient must inhale the proper concentration during the entire treatment, if it is to be effective.

"2. The method of administering the gas must be simple and economical.

"3. Patient should not necessarily be confined to one room, but should be permitted to breathe pure, fresh air.

"4. The treatment must be perfectly safe and practical. An overdose due to the inadvertent release of an excess of gas must be rendered impossible."

In order to meet his ideals a special inhalator has been devised. His conclusions are as follows:—

"1. Inhalations of chlorine of a concentration of 0.015 mg. per liter, for one or more hours, have a distinctly curative value in coryza, acute bronchitis, acute laryngitis, pharyngitis, chronic bronchitis, and whooping cough, provided, however, that the concentration of 0.015 is maintained at every inhalation.

"2. The small percentage of unfavorable reports as to the curative value of chlorine gas in acute respiratory infections can in most cases be readily shown to be due to the fact that the treatment was not properly administered and the curative concentration of 0.015 was not maintained at every inhalation of the patient."

There is still considerable scepticism on the part of many practitioners relating to the value of chlorine inhalations.

OUTING

Upon the invitation of H. P. Hood & Sons, milk contractors, members and guests of Essex North and South, Middlesex East, North and South District Medical Societies, enjoyed an outing at Cherry Hill Farm, Beverly, on Wednesday, August 5. Sports were enjoyed and games played, prizes awarded, luncheon served and this model farm, so beautifully situated and perfectly kept, was inspected.

Mr. Hood bade his guests welcome, and then the presiding officer introduced Major James F. Coupal, Physician to the President, who spoke of the growing recognition of the importance of the pathologist, and paid a fine tribute to Dr. E. A. Codman of Boston for his efforts in attempting the registering of cases of bone cancer.

Dr. Coupal stressed the importance of a similar attempt now being made to register cases of "Hodgkins disease" and round cell infiltration and announced that the cervical work of this effort would be undertaken by himself and Major George R. Callender, Curators of the Army Medical Museum at Washington.

Physicians encountering these disorders are requested to report such cases to Major Coupal or Major Callender.

Wm. T. Hopkins, *Reporter.*

EXPECTATION OF LIFE AT BIRTH, UNITED STATES REGISTRATION STATES, 1921 TO 1923. BY SEX.

Year	Total	Males	Females
1923	57.32	56.19	58.55
1922	57.89	56.81	59.07
1921	58.01	57.02	59.06

The year 1921 showed the highest values for the expectation of life on record in the public health history of the United States. The lessening in these figures for 1922 and 1923 is not numerically important, and was very largely the result of the greater prevalence of influenza and pneumonia in the early months of these two years. It is tremendously significant, however, that the favorable state of the public health has persisted at practically the same level for three consecutive years. The advance indications are that the year 1924 will show an improvement even over 1921, and of course, over 1922 and 1923.—*Bulletin, Metropolitan Life Insurance Co.*

AVERAGE AGE IN NEW YORK STATE HAS RISEN FROM 24 YEARS IN 1840 TO 30 YEARS NOW

Special to The New York Times

Albany, Aug. 9.—Under the caption "We Are Getting Older," the current issue of Health News, issued by the State Department of Health, declares that "the estimated average age of our people now is 30 years and 3 months, whereas eighty-five years ago we were barely out of our 'teens." The following table of the average age of the population of New York is based on returns from the Federal census:

Year	Average Age
1840	24 years 6 months
1850	24 years 7 months
1860	25 years 4 months
1870	26 years 7 months
1880	27 years 8 months
1890	28 years 6 months
1900	28 years 7 months
1910	28 years 11 months
1920	29 years 8 months
1925 (est.)	30 years 3 months

"The figures given must not be interpreted as indicating the number of years by which the span of life has actually been lengthened," the article says, "These facts may be gleaned from another source; namely, from so-called life tables. Unfortunately for this State, we have no tables for the earlier years. We shall, therefore, compare the 'expectation of life'—the number of years a new-born baby was expected to live in 1901 (the first year for which we have these data)—with 1910 and 1920:

EXPECTATION OF LIFE

Year	Males	Females
1901	45 years 7 months	49 years 3 months
1910	47 years 11 months	51 years 11 months
1920	52 years 10 months	55 years 8 months

"Thus in only twenty years the expectation of life at birth has increased for males by 7 years and 3 months; for females by 6 years and 5 months.

"Two factors have exerted the greatest influence upon the age composition of this State

as well as of most of the other States in this country—immigration and the advance in preventive and curative medicine. Progress in public health work has increased the duration of life of the people and therefore raised its average age. On the other hand, immigration has retarded the normal ageing process, by adding every year to our population thousands of young persons from overseas. If the purpose of present restrictive immigration laws is carried out the average age of the people in the future will mount even at a higher rate than it has in the past."—*New York Times.*

DR. HOWARD IS SAFE IN HANDS OF BANDITS

PEKING, Aug. 6 (A. P.)—Dr. Harvey J. Howard of the Peking Union Medical College, who was captured by Manchurian bandits on July 20, when Morgan Palmer, an American, was killed, is held by the bandits at a place seventy li (about twenty miles) from Fuchow-hsien, which is the nearest station to Palmer's ranch on the Sungari River. This information was included in a telegram which said that Dr. Howard was being well treated. Officials of the Manchurian Province of Holung-kiang have assembled at Fuchow-hsien and are ready to begin negotiations with the bandits for Dr. Howard's release.

APPOINTMENTS

THE President of the Massachusetts Medical Society has retired from the Committee of Nine in charge of the JOURNAL and has appointed Dr. John W. Bartol of Boston to fill the vacancy, and also has appointed Dr. Frank W. Snow of Newburyport to take his place on the Committee on Public Instruction.

ANCIENT MEDICINES STILL USED TODAY IN PERSIA

BEING SELECTIONS FROM AN OLD PERSIAN WORK ON THERAPEUTICS, KNOWN AS "THE BOOK OF JOSEPH," WHICH WAS WRITTEN IN HERAT IN 917 A. H. (1511 A. D.)

TRANSLATED BY H. A. LICHTWARDT, M.D.

American Hospital, Meshed, Persia

THE BOOK OF JOSEPH WHICH IS A COLLECTION OF ALL THERAPEUTICS

These verses which are known as "The Values" are composed of all the elements which are necessary and valuable for the doctor. Written by me, Joseph, son of Mohammed, son of Joseph the doctor, at Herat in 917 A. H. (1511 A. D.)

In the name of God, the merciful and compassionate:—

To you who indulge in meditation and prayer,
All of wisdom is found in these verses so fair.

From the sea of knowledge, this most precious pearl,
Is now presented to an ailing world.

All medical science is to serve two ends,
With willing ears, list to Joseph, my friends.
Prophylaxis is the first and foremost of these,
The other is to remove the cause of disease.

Complete directions for treatment:—

Hark to me, all of you who wish to increase,
And grow in the knowledge of treatment of disease.
To remove the cause, give something opposed,
But for prophylaxis, the same type must be used.

Note:—that is, based on the humoral theory, to remove the cause of a "hot" and "moist" disease, a cold and dry medicine must be given; but for prophylaxis against such a disease, a corresponding "hot" and "dry" medicine is used.

Explanation of the humors:—

Four humors there are, one, the blood, so red,
It is warm and moist, like the air, 'tis said.
Another is mucous, called phlegm of old,
Which, like the water, is wet and cold.

There is another whose name is bile,
'Tis warm and dry like fire, not vile.
The other is dry like dust, and cold,
'Tis called black bile, by wise men of old.

Explanation of the relative importance of the humors:—

The most important of humors is the one called blood,
Which for your body is the vital food.
The next one is the phlegm, then the bile, warm not cold,
Then black bile, 'tis the least of the humors, I'm told.

Explanation of the humors, according to the color of the patient:—

Blood is indicated when one's color is red,
While yellow is the sign of bile, it is said.
White, when observed, is of phlegm the sign,
And black shows that black bile you'll find.

Explanation of the humors, according to the color of the urine:—

If red urine is passed then blood has been lost,
But if it is yellow then bile is the cause.
A urine that's white, comes from phelgm all the while,
And when it is black, the cause is black bile.

Explanation of the danger of going into cold water:—

To bathe in cold water will give much distress,
To five classes of people whom I now address:—
Old folks and children, and those who've caught cold,
Or those who've just eaten, or have a diarrhea that's old.

Value of herb in alkali in three diseases:—

If one dram of herb alkali is eaten each day,
'Twill cure menorrhagia, the wise men all say.
If the urine is scant, it causes more flow,
And cures anasarca, as good doctors know.

Value of gold, pure and in solution:—

If from the neck of a child you hang pure gold,
They ne'er will be frightened, 'tis true, I'm told.
That child from epilepsy will ever be free,
And from other diseases, wise men tell me.

Gold in solution if eaten each day,
Four grains is sufficient to drive ills away.
Any heart that is weak is made well and strong,
And ills of black bile will not last very long.

The easy and complete cure of sores or burns:—

First burn the feathers of a hen,
Then grind them up for medicine.
Apply to the sore for several days,
And 'twill be healed in the best of ways.

The value of quince water:—

Use water of quince to break up your thirst,
It quiets all belching and that which is worse,
Vomiting, is stopped, and blood that is spit,
Or fluid in the bowels 'twill quickly stop it.

The cure of warts:—

To cure any warts, take the skin of a snake,
Wrap over the wart, then some date-water make.
And soak all in this for several days,
Then all of the warts to their roots it will raze.

The value of fumitory:—

For scabs that itch and joints that ache,
Some fumitory and vinegar take.
And rub on well, 'tis also sure
For belching of gas, a positive cure.

The value of sweet basil:—

Sweet basil is used both seeds and leaves,
For intestinal ills it gives much ease.
For elephantiasis and disease of the heart,
A fresh-made lotion should be rubbed on the part.

The value of burnt human bones:—

To burn human bones is a very good notion
With rosewater mixed 'twill form a good lotion.
On heads that ache and ulcers annoint.
'Twill cure epilepsy and a pain in a joint.

The value of wine of French lavender:—

If a person will drink French lavender wine,
For all melancholia, it is said to be fine.
It also is good for a large hemorrhoid,
And a sure cure for all by ringworm annoyed.

The value of sagepenon:—

If you one dram of sagepenon will eat,
As a cure for the colic it can not be beat.
It drives away gout and epilepsy too,
Also dizziness and anasarca if they trouble you.

The value of sumach:—

If the intestines have ulcers and need to be bound,
For this and dysentery, sumach is renowned.
'Tis also a well known appetizer, they say,
And 'twill drive all the pains in your stomach away.

The value of cinquefoil:—

Inhale of the vapor of cinquefoil,
'Twill drive away all thought of toil.
'Tis an anaphrodisiac of great renown,
Decreases desire and keeps passions down.

The value of burnt oyster shell:—

For a dentifrice prepare burnt oyster shell,
'Twill clean the teeth and clean them well.
'Tis also a cure for ulcer of the eye.
And to thickened lids each day apply.

The value of cypress leaves and vinegar:—

To quickly blacken and strengthen the hair,
Leaves of cypress and vinegar prepare.
This also is good for sore, aching teeth,
Applied to the tooth, it at once gives relief.

The value of the root of the white lily:—

The boiled juice of white lily root washed on your face,
Will remove all the freckles that were your disgrace.
And if you inhale its fragrance so sweet,
'Twill drive from your head, all pain and all heat.

The value of eating crabs:—

The eating of crabs is good for a cough,
For lung ulcers too, yes, you must not scoff.

And if you, perchance, by a scorpion are bit,
A crab rubbed there-on drives the poison from it.

General directions for health:—

To keep your brain clear, each day eat some meat,
But avoid all the foods which increase body heat.
Stay not awake much in the hours of the night,
Nor waste time in sleep while there is still light.

Note:—These verses which I have crudely translated from the Persian are from an old medical book, written over four hundred years ago, but still a great favorite with the old-style Persian doctor, who still uses the various remedies described herein. This book is used not only by the doctors as their favorite textbook, but is also used as a book of household remedies in the few homes where one of the members can read.

This interesting old humoral system of medicine will gradually disappear in Persia, as the number of better trained Persian physicians (of whom there are now very few) increase. These educated Persian doctors, graduates of the Imperial Medical College in Teheran, and some of whom have also studied in Europe all use the modern system of therapeutics, and although most of them have not had sufficient education or experience to qualify as physicians in America, yet they are doing a very good work, and unfortunately there are only a few of them, and most of them confine their practice to the capital city, Teheran and a few of the other larger centers. Counting all these men, as well as the few American, British and other European physicians there is in Persia today one doctor to every eighty thousand (80,000) people, whereas in the United States there is one to every 726 people. Thus vast areas in Persia are entirely without medical attention, and the existing medical school should be improved, and possibly one or two others established, in order that trained physicians be sent forth not only to alleviate suffering and cure disease, but also to spread the doctrines of hygiene and sanitation and preventive medicine.

TUBERCULOSIS IN GREENLAND

It is reported that tuberculosis is making serious ravages among the natives of Greenland, where the knowledge of the principles of hygiene is very primitive. A year ago a society for the relief of the children of Greenland was formed in Denmark (to which country Greenland belongs), which already has 5,000 members. With the aid of the Danish Ministry of the Interior and Health Service and the officials concerned with the government of the island measures have been adopted for the installation of a 20-bed hospital for tuberculous children. The society is also taking measures for the protection of orphans in Greenland and is endeavoring to find foster homes for them.

NEW YORK HEALTH DEPARTMENT SCORES SANATORIUM OBJECTORS

The New York State Department of Health has recently rendered an important decision with reference to a proposed ordinance supported by the citizens and officials of the village of Otisville, N. Y. A large municipal sanatorium for tuberculosis, owned by the City of New York, is located on the outskirts of the village of Otisville. The citizens of the community decided to enact an ordinance to exclude from the municipality persons suffering from tuberculosis. In rendering an opinion to the state department of health, Attorney-General of New York State, says in part:

"The proposed legislation is discriminative, it is not reasonable and is an unwarranted infringement of personal liberty. It prohibits the carrying on of lawful business, not necessarily a nuisance and deprives people of their property or the full enjoyment thereof without due process of law and, in my opinion, would be illegal."—*Bulletin N. T. Association.*

THE MUSINGS OF A HOSPITAL PATIENT*

"When the last examination is ended,
When the last special test has been made;
When the doctors and nurses have vanished,
And every part of me X-rayed,—

"I shall rest—and Lord I shall need it,
Lie down for an eon or two,
Till the Master of all good workmen
Shall put me together anew.

"And don't you think I'll be happy?
I'll sit in my old chair;
I'll hike, and dig, and visit
And go when I want—and where.

"And there'll be no hypodermics,
No tablets, nor drops, nor pills,
And there'll be no occasion for doctors
'Cause I won't have any ills.

"And only the birds shall scold me,
And only the breezes blame,
When the sun rises high in the morning,
And sets in the evening's flame.

"For Health will be mine, and the nightmare
Of hospitals, drugs and pain
Will be over because it is springtime
And I will be home again!"

*Written by a patient in a Chicago hospital who had a long and painful illness. She wrote it to amuse her family. Physicians may enjoy reading it.

DURATION OF LIFE

In 1800 the average length of life was thirty-three years, in 1855 it was forty years, and in 1920 it was fifty-eight years, according to *Life and Health* (Washington, D. C.). Eighteen years have been added to the average duration of life since 1855. From 1910 to 1920 the increase in the life span was four years.

"It is generally considered that the larger part of the world's burdens is borne by men above forty years of age. Thus in 1800 the average man died seven years before he reached the age of his greatest usefulness. In 1920 the average man lived eighteen years beyond this age.

"If we take the age of twenty-one as the time that men reach their productive period, we can see that in 1800 the average man had but twelve years of productive life ahead of him, while in 1920 he had thirty-seven years of splendid usefulness before him.—*Harper Hospital Bulletin.*

THE DETERMINATION OF CARBON MONOXIDE

THE value of the pyrotannic acid method for the quantitative determination of carbon monoxide in blood and in air, by means of which dangerous occurrences of this insidious poison-gas may be detected much more quickly than by methods previously used, is again emphasized by the Bureau of Mines of the Department of Commerce.

Carbon monoxide may be formed in many places, and inhalation of this treacherous gas is a frequent and widely distributed cause of poisoning that ranges in severity from headache and lassitude to unconsciousness and death, state Dr. R. R. Sayers, Chief Surgeon, and W. P. Yant, associate chemist, of the Bureau of Mines.

People are continually being affected by carbon monoxide in homes and garages, around gas and gasoline engines and blast furnaces, in fighting fires, after blasting in mines and quarries, and after mine fires and explosions; in fact, any place where there is possibility of exposure to the products of combustion of carbonaceous fuels or products. As cases of this type of poisoning often occur from the most unsuspected sources, and as the indicating symptoms of carbon monoxide poisoning, such as headache, nausea, dizziness, collapse, and unconsciousness are often attributed to other causes, it is essential to have suitable means whereby the true condition can be ascertained.

The only infallible diagnosis of carbon monoxide poisoning is made by examination of the blood for carbon monoxide hemoglobin, the compound which the gas forms with the coloring matter of the blood. Through the formation of this compound the hemoglobin becomes ineffective as an oxygen carrier. A mere qualitative examination for this compound will indicate whether or not carbon monoxide is present, but in view of the obvious desirability of knowing whether or not carbon monoxide is the primary cause of the condition of the patient, it is necessary to make a quantitative determination of the carbon monoxide hemoglobin present.

The Bureau of Mines, in its investigation of many cases of industrial and domestic poisoning from carbon monoxide, found it necessary to develop a method and apparatus that could be immediately taken to the scene of a poisoning, and which would give accurate results as to the carbon monoxide in the blood and in the air.

Details of the pyrotannic acid method for the quantitative determination of carbon monoxide in blood and air are given in Technical Paper 373, copies of which may be obtained from the Bureau of Mines, Department of Commerce, Washington, D. C.—*Department of Commerce, Washington.*

PLANS OF THE DIPHTHERIA COMMISSION OF NEW YORK CITY

THE Health Commissioner of New York City has appointed a Diphtheria Commission under the leadership of Dr. Arthur W. Bingham, Chairman, and Dr. Louis I. Harris, Secretary.

The Commission will begin intensive work in the Bellevue-Yorkville section and may later be given a city wide application.

The following program has been agreed upon:

I. Coöperation with the Department of Education:
   a. Teachers to be informed through lectures, circulars, special bulletins, and in other ways as to the significance of diphtheria, its modes of transmission, and the signs and symptoms by which an intelligent layman might recognize the disease among school children.
   b. Teachers were also to be informed on modes of coöperation with the constituted health authorities so as to make our present safeguards more rigorous in order to discover suspected cases and to exclude contact cases.
   c. It was agreed to ask the Commissioner of Health to communicate with the Superintendent of Schools, Dr. O'Shea, in order to secure full coöperation and coördination of the medical forces in the Departments of Education and Health, in the work of instruction of teachers and for such other coöperative efforts as might be deemed serviceable in the light of further study and experience.

II. To intensify the services of the Bureau of Preventable Diseases, and the Bureau of Child Hygiene:
   a. The Commission deemed it desirable to ascertain ways to make even more rigid,

if possible, the present methods of school inspection and school supervision by the doctors and nurses of the Bureau of Child Hygiene.

b. To bring about, if practicable, a still closer correlation of effort between the Bureau of Child Hygiene and the Bureau of Preventable Diseases in their joint efforts in dealing with suspected cases of diphtheria.

c. To intensify efforts in home visits by medical inspectors of the Bureau of Child Hygiene or the Bureau of Preventable Diseases to homes of absentee children who might be reasonably suspected as suffering from diphtheria.

d. *New Activities of the Bureau of Preventable Diseases:*
The assignment of a larger unmber of field diagnosticians to the Bureau of Preventable Diseases in the Bellevue-Yorkville District for the following purpose:

1. To visit all suspected cases of diphtheria reported by the school nurses, school authorities, health agencies, or any other dependable persons.
2. To make visits for purposes of diagnosis in all cases of sore throat where called for by physicians, health workers, or others in the District.
3. To administer antitoxin whenever and wherever needed to prevent the delay which is the most frequent cause of fatal termination in these cases.

III. Change in Laboratory Culture Slips:

The revision of the culture slips now employed by the Department of Health, so that they may carry in heavy type a legend such as follows,—

"IF YOU SUSPECT DIPHTHERIA, GIVE ANTITOXIN. DO NOT WAIT FOR RESULT OF CULTURE."

The Commission deemed that the printing of such a legend would assist the private physician in persuading parents of the necessity of this procedure where otherwise they might be reluctant, or suspect the motives of the doctor in urging this measure.

IV. Free Antitoxin to Private Physicians:

To provide every physician in the Bellevue-Yorkville district with 10,000 units of antitoxin in a syringe, free of charge, to be carried in the doctor's bag and to be ready for immediate use as occasion may require. Such supply to be replenished as, and when necessary.

V. Pre-School Age Campaign:

To intensify the campaign of prevention for the special benefit of children of pre-school age, through the baby health stations, settlement houses, maternity centres and other local agencies. The Schick test and toxin-antitoxin administration to be applied whenever and wherever possible to children of this age group. Special educational and coöperative activities to be undertaken to interest private physicians and parents in this campaign.

VI. Education of Parents and Guardians:

A general campaign of education for the benefit of parents and guardians, through lectures, newspaper publicity, posters, circulars, through literature distributed through drug-stores, lodges, churches and the Boy Scouts; through exhibits, etc., etc.

VII. Coöperation of Dispensaries:

To secure the coöperation of dispensaries and clinics where large numbers of children who may be suffering from diphtheria first present themselves, in order to overcome an occasional laxity, and in the enforcement of public health procedure. It was deemed advisable to secure the coöperation of the Dispensary Development Committee (Dr. Michael Davis) for this purpose.

VIII. To Secure Coöperation of Medical Profession:

To secure the coöperation of the medical profession in all these activities so that the work may profit by their individual and collective assistance, and to prevent interference with the private activities of physicians.

RECENT DEATHS

HALL—Dr. William Hall of Cambridge, for years visiting physician for British ships arriving in Boston without a ship's surgeon, died at his home, August 5, 1925, at the age of 67.

He was a native of Portsmouth, Eng., a licentiate of the Royal College of Physicians, Edinburgh, in 1885, and was licensed to practice in Massachusetts in 1895 and settled in Brookline. He moved to Cambridge in 1917. He is survived by his widow, one son and two daughters.

TRUEMAN—Dr. Nelson Gore Trueman, who had been attached to the State Department of Mental Diseases as an examiner of prisoners, was drowned in the St. John River near Metepec, N. B., August 10, 1925.

He was born in Boston in 1878, took a degree in dentistry in 1900 and an M.D. from Harvard Medical

School three rears later, then specializing in neurology. He was for a number of years assistant physician at the Danvers State Hospital. In the fall of 1920 he opened a private sanitarium on the Ganey estate, Dearborn Street, Salem, for mental cases.

His home was at Temple Court, Lynde Street, Salem. A wife and two daughters survive him. A week before his death he left to join them at St. John for a vacation.

From 1915 to 1924 he was a Fellow of the Massachusetts Medical Society.

BARTLETT—Dr. Charles Watson Bartlett, associate medical examiner for the Fifth Plymouth District, died at his home in Marshfield, after a long illness, on August 9, 1925, at the age of 60.

Dr. Bartlett was a native of Westhampton. He was educated at Williston Seminary and at the College of Physicians and Surgeons, Columbia University, New York, where he received his M.D. in 1889. Ten years later he settled in Marshfield and joined the Massachusetts Medical Society. He was chairman of the Board of Health and school physician. Besides being a Mason he was a member of the Hatherly Medical Club. He is survived by a widow and by one daughter.

CORRESPONDENCE

MR. NUNN'S COMMENT ON THE CRITICISM OF HIS APPEAL TO LEGISLATORS

Boston, Mass., August 13, 1925.

Editor, Boston Medical and Surgical Journal:

Dear Sir—I have read your editorial of August 13, 1925, commenting on my "Open Letter to Senators and Representatives," in which you say:

"Nowhere does Mr. Nunn show pity for the approximately twenty thousand persons killed by automobiles in this country, or the very many thousands more who are seriously injured."

I am sorry that your state of mind is such that any discussion by me of the expediency of a proposed law in which physicians would have something more than a nominal pecuniary interest, seems to you to be conclusive evidence, not only of my antagonism to doctors, but of my callous indifference to human suffering.

It is common knowledge that carelessness, undue speed, neglected brakes, slippery pavements, headlight glare, and drunken drivers account for almost, if not all personal injuries and deaths caused by automobiles. I am sure you would readily admit the truth of this statement were it made by any other than

Yours truly,
Henry D. Nunn,
Director and General Counsel,
Medical Liberty League, Inc.

Editorial Note:—The Director and General Counsel of the Medical Liberty League says that he is sorry. Sorry for what? For the state of mind of the editorial writer who finds in the statements made by the learned counsel "evidence of antagonism to doctors" and "indifference to human suffering."

The interpretation of one's attitude on a given question may depend to a degree on previous utterances or written statements.

His last drive in his appeal to legislators was characteristic of his previous attitudes. He has had many opportunities to show respect for scientific medicine and practitioners of the healing art. We have read much that he has written and heard him speak on many occasions, but do not recall any statement which could be construed as admitting the value of vaccination, the Schick test, the specific treatment of diphtheria, or the conquest of yellow fever and typhoid fever, the prevention and cure of malaria, ophthalmia neonatorum, syphilis, tetanus, and the many measures which have contributed to the prolongation of life, nor has he ever paid any tribute to surgery, which saves many thousands of lives every year and brings comfort and well-being to cripples. If his silence, as well as his statements, have led to misinterpretation of his attitude, we will be pleased to be set right. We believe that there is abundant evidence that some lives have been lost because some people who were not intoxicatd were driving at normal speed in cars properly equipped on roads that were in good condition, but who were physically, morally or mentally lacking in some ways.

Please, Mr. Counsel, don't be sorry for our state of mind. Have a little sympathy for those who suffer and who need to be saved. Your letter does not extricate you from the situation created by your appeal to our law makers.

Our inability to prevent the great majority of accidents should not lead to indifference concerning the smaller number of those which are preventable.

ANTI-VIVISECTION

(Published by permission of *Science*)

We are permitted to publish the following correspondence between Dr. David Starr Jordan and Mr. Luther Burbank:

Stanford University P. O., California,
June 1, 1925.

Mr. Luther Burbank,
Santa Rosa, California.

My dear Burbank:

Will you pardon one of your oldest friends to express sincere regret over your endorsement of the work of an "Anti-vivisectionist Society"?

To my mind, and I have good reason to know it, this movement is based on the same kind of ignorance and prejudice that animates the much less mischievous anti-evolutionist organizations. The progress of sanitation, associated with that of medicine, has been along the very firing line of science for the last fifty years, ever since the discovery of bacteria and their relation to infectious disease. The result of research on diet and causes of disorder has been to lengthen the life of the average civilized man for by fifteen to twenty years. Till these days of experiment, physicians were able to treat symptoms mainly, for the solid basis of science had not been reached.

An example of the method of science is that by which Dr. Walter Reed and his associates have controlled yellow fever. The noble work of my old friend, Professor Ricketts, in making clear the nature of "mountain fever" in Montana, and of typhus in Mexico (in which he fell himself a martyr), will also illustrate.

Intensive study of another type of disorder, sugar poisoning, gave us insulin, a drug which has already saved thousands of lives condemned to death by diabetes.

Most such studies can only be made by tests on certain animals, rabbits, guinea pigs, rats, goats, dogs and sometimes monkeys or horses. Literal "vivisection" (cutting them up alive) is a rare thing, not done without anaesthetics. Certainly it has never been wantonly practised by any sane man engaged in real research. There are two or three cases on record where outrageous acts have been committed, mostly so far as I know in France. Napoleon gave the cue when he said that "a great soldier like me does not care a tinker's dam for the lives of a million men." But the greatest of Frenchmen, Pasteur, was guided solely by the spirit of helpfulness.

There may have been some cases of some tyro teacher cutting up a live animal for class illustra-

tion. But I have not heard of a case for forty years, and it has nothing to do with medical research as practised in legitimate colleges or in actual centers of research like the Rockefeller Institute.

"Anti-vivisectionist" publications, so far as I have seen them, show certain traits:

1. Sheer ignorance of discoveries of the last half century, notably as to bacteria and protozoa.
2. Quotations from "eminent physicians" without names or dates.
3. Careless or conscienceless use of quotations from men of science.
4. Alliance with advocates of "freedom in medicine," which would double the horde of impostors who prey on the ignorance of the public in regard to medicine and sanitation.
5. Encouragement of faith-healing cults, sincere enough, but capable of dealing only with the promotion of optimism, a method which in many cases may be of positive use in certain types of disorder, but tragic if adopted for setting a broken leg, in treating an infectious malady and the like.

You would not think it workable truth to ascribe your plant successes to your magical control over the fatty matter ("materia pinquis") of the earth by waving of sensitized wands, rather than to scientific operations of selection, hybridization and segregation. I know of people who have gone to Santa Rosa to "see the wizard wiz." I always went for exactly the opposite purpose, to see how great useful results can be achieved by rigid use of all knowledge secured within the field of plant development.

With high appreciation of all your many services to clear thinking, as well as to horticulture, I am

Very sincerely yours,
(Signed) DAVID STARR JORDAN.

Santa Rosa, California,
June 2, 1925.

Dr. David Starr Jordan,
Stanford University, California.

Dear Dr. Jordan:

I thank you most heartily for your very kind and very acceptable letter of June 1st, and you do state the truth in the case without doubt very accurately. I have been told by those who have participated that vivisection has been practised on animals even in the High Schools by those who did not intend to take a medical course. And also I have had statements from parties at the State University who have told me that very evident cruelty has been practised upon dumb animals.

I wrote that letter to the Anti-vivisection Society of California hastily and did not express myself as fully as I did to the New York Society which was more explicit in confining my remarks to the High Schools. I have never doubted the enormous value of the experiments that were carried on by real scientists anywhere or under any circumstances. I have seen the experiments of some of these scientists in the preparation of diphtheria vaccine, smallpox vaccine, typhoid fever vaccine and several other vaccines which have proved successful, these by scientists, and have never seen any unnecessary cruelty practised upon any animals, either horses, guinea pigs, rabbits or other animals.

I hope this will make my standing plain to you and I do not question the facts stated in your letter which are all very true as far as I know. I am sure that we are both working for the best interests of humanity and if I have loaned my name to any parties who are working against science and humanity I wish to have my name taken from such organizations.

Faithfully yours,
(Signed) LUTHER BURBANK.

CONNECTICUT DEPARTMENT OF HEALTH

MORBIDITY REPORT FOR THE WEEK ENDING AUGUST 1, 1925

Diphtheria	17	German measles	1
Last week	17	Mumps	4
Whooping cough	74	Pneumonia, broncho	8
Last week	75	Pneumonia, lobar	8
Scarlet fever	14	Poliomyelitis	3
Last week	14	Trichinosis	1
Typhoid fever	11	Tuberculosis, pulmonary	23
Last week	4		
Measles	23	Tuberculosis, other forms	3
Last week	60		
Chickenpox	8	Gonorrhea	23
Encephalitis epid.	1	Syphilis	8

MORBIDITY REPORT FOR THE WEEK ENDING AUGUST 8, 1925

Diphtheria	18	Chickenpox	5
Last week	17	Influenza	1
Diphtheria bacilli carriers	2	Malaria	1
		Pneumonia (broncho)	6
Scarlet fever	24	Pneumonia (lobar)	10
Last week	14	Poliomyelitis	1
Typhoid fever	8	Septic sore throat	3
Last week	11	Tetanus	2
Measles	15	Tuberculosis, pulmonary	16
Last week	23		
Whooping cough	83	Gonorrhea	25
Last week	74	Syphilis	23
Cerebrospinal men.	1		

RHODE ISLAND WEEKLY MORBIDITY REPORT

FOR THE WEEK ENDING JULY 25, 1925

Diphtheria	1	Scarlet fever	6
Typhoid fever	3	Measles	11
Smallpox	4	Poliomyelitis	1

NEWS ITEMS

REORGANIZATION ANNOUNCED—With the present issue of *The Nation's Health*, Dr. C.-E. A. Winslow, professor of public health, Yale School of Medicine, New Haven, Conn., retires as editor of *The Nation's Health* and is succeeded by Dr. Frank L. Rector, former secretary of the Conference Board of Physicians in Industry and medical investigator for the National Industrial Conference Board, New York. Dr. Rector will be located in the Chicago office, and all of his time will be devoted to the work. The publishers are happy to announce that Dr. Winslow will continue his active interest in the work as a member of the consultant editorial board which is being formed to assist Dr. Rector in his work.

Mrs. Susa P. Moore, who has served this publication so ably since its establishment, has been named managing editor.

The changes have been made to overcome the difficulties of functioning with the editorial and publication offices in widely separated places. It is expected that the reorganization will make for more efficient service in the field served by *The Nation's Health*.

VETERANS' HOSPITAL AT NORTHPORT, L. I.—The Federal Hospitalization Board has selected a location at Northport, L. I., for a neuro-psychiatric hospital for veterans of the World War. The cost of the 550 acres and the hospital buildings will amount to $3,000,000 and will provide 1000 beds.

Citizens of this section have protested against the use of this locality and were given a hearing by General Hines, head of the Bureau, but the Board will proceed with the plans.

DR. FRANK HERBERT CLOUGH of Medfield has been appointed Associate Medical Examiner of the Seventh Norfolk District, by the Governor, in place of Harry L. Park.

REPORTS AND NOTICES OF MEETINGS*

THE INTERSTATE POST-GRADUATE ASSEMBLY OF AMERICA

THIS organization will meet in St. Paul, Minnesota, October 12th, 13th, 14th, 15th and 16th, 1925.

A very full program has been arranged, the details of which will be published in September.

Most of the surgical and medical problems of the day will be discussed. This meeting should be attended by all active practitioners who can spare the time.

ESSEX NORTH DISTRICT MEDICAL SOCIETY

THE Quarterly Meeting of this Society will be held at Danvers State Hospital, Hathorne, Mass., upon invitation of Geo. M. Kline, M.D., of Beverly, Commissioner of Mental Diseases, on Wednesday, Sept. 2, at 2 P. M. sharp, with the following programme:

1. Paper by Albert M. Barrett, M.D., of Ann Arbor, Michigan, Professor of Psychiatry at University of Michigan, Medical School. (40 minutes.)

2. Chas. F. Painter, M.D., of Boston, Chairman of the Standing Committee on Medical Education and Medical Diplomas upon "The Menace of Indifference." (12 minutes.)

3. Thos. J. O'Brien, M.D., of Boston, Secretary of the Joint Committee on State and National Legislation upon "Medical Legislation." (15 minutes.)

Free discussion is invited on all subjects (5 minutes each).

Lunch will be served after the meeting. The Censors meeting will occur Thursday, Nov. 5, at 2 P. M. sharp at Hotel Bartlett, Haverhill. Candidates should present diplomas to Secretary one week in advance.

Any Fellows of the Massachuetts Medical Society who would like to be shown through the hospital previous to the meeting under the supervision of John B. Macdonald, M.D., Superintendent, are invited to come at 1 P. M.

J. FORREST BURNHAM, M.D., *Secretary*,
567 Haverhill St., Lawrence, Mass.
RANDOLPH C. HURD, M.D., *President*.
August 25, 1925.

THE NEW HAMPSHIRE SURGICAL CLUB 27TH ANNUAL MEETING

THE New Hampshire Surgical Club will hold its 27th annual meeting at the Hotel Wentworth, Portsmouth, New Hampshire on Monday, August 31, 1925.

This is a week end get together for the members, their families and guests. Reservations may be made for those who wish to come to the hotel Saturday, the 29th, or earlier for those who desire. The Wentworth is one of the famous summer hotels of New England and is particularly well equipped to provide and entertain.

The Portsmouth Medical Society is taking an active interest in the success of this meeting, and have appointed the following committees:

General Arrangements: Drs. Neal, Dickson and MacLachlan.

Reception and Social: Drs. Luce, Hanaford and Eastman.

Golf: Drs. Carty, Tredick and Taylor.

Fishing Trip: Drs. Higgins, White and Hazard.

The Portsmouth Chamber of Commerce is coöperating.

A deep sea fishing trip has been planned for August 30. Boat to leave at 10 A. M. There is a golf match for Monday forenoon, August 31, and a continuous sight seeing trip is planned for both August 30 and 31st. On August 28 and 29th, the National Amateur Women's Swimming Contest will take pace in the Wentworth pool. This is the biggest swimming event ever staged in New England and will include the foremost swimmers in the world. Those wishing to come earlier for this event may have the special club hotel rates, namely, $8 and $9 per day to include all hotel expenses.

The regular business of the Surgical Club will begin August 31 at 2 P. M. in the Auditorium will include the annual business and election of officers and the annual address by the President, Emery M. Fitch, M.D., of Claremont, New Hampshire.

The scientific program is as follows:

Double Ectopic Pregnancy, John F. Gile, M.D., Hanover, N. H.

Heart Wounds with Report of Cases, John H. Long, M.D., Brooklyn, N. Y.

Hernia with Special Reference to Operation Under Local Anesthesia, James F. Mitchell, M.D., Washington, D. C.

The annual banquet will take place in the banquet room of the Wentworth at 7:30 P. M., ladies and guests invited.

Dr. Eugene B. Eastman, M.D., of Portsmouth, N. H., is toastmaster.

The after dinner speeches:—

Our Surgical Club—Emery M. Fitch, M.D., Claremont, N. H.

When New York is no More, What About Brooklyn?—John H. Long, M.D., Brooklyn, N. Y.

My Recent Visits to the European Clinics—James F. Mitchell, M.D, Washington, D. C.

The Legal Aspect of Surgery and Other Things—Hon. Henry M. Warren, Philadelphia, Pa.

Music and dancing will conclude the evening program.

*Notices of meetings must reach the JOURNAL office on the Friday preceding the date of issue in which they are to appear.

The present officers of the New Hampshire Surgical Club are:

President, Emery M. Fitch, M.D., Claremont; Vice President, James B. Woodman, M.D., Franklin.

Secretary and Treasurer, John F. Holmes, M.D., Manchester.

Executive Committee—President, Secretary-Treasurer, Ex-Officio; Elmer M. Miller, M.D., Woodsville; Clifford S. Abbott, M.D., Laconia; Daniel C. Norton, M.D., Manchester.

CLINIC AT THE EASTERN MAINE GENERAL HOSPITAL

A CLINIC under the auspices of the Eastern Maine General Hospital, the Penobscot County Medical Society, the Maine Public Health Associaton and the Maine State Board of Health was held at the Eastern Maine General Hospital and the Common Council Room, City Hall, Bangor, Maine, on August 18 and 19, 1925.

The first day was given to clinical work at the Hospital, followed by discussions by Dr. Channing Frothingham of the Peter Bent Brigham Hospital, Dr. Daniel F. Jones of the Massachusetts General Hospital and Dr. Frederic J. Cotton of the Boston City Hospital. In the evening a banquet was served at the Penobscot Valley Country Club.

The program for the second day was as follows:

Common Council Room, City Hall, 10:00 A. M.-12:30 P. M. 2:30-5:00 P. M.

The Health Officer as Health Leader in the community, C. F. Kendall, M.D., Commissioner of Health.

The Child before his School Age and the Training needed in Nutrition for the Child, Albert Fellows, M.D., Bangor, Maine.

The Early Findings and Care of Tuberculosis, Carl R. O'Brien, M.D., Bangor, Maine.

What Instruction may an Expectant Mother hope to have from her Private Nurse. Informal Discussion.

Value of coöperation between Official and Lay Organizations, B. L. Bryant, M.D., Secretary Maine Medical Association.

Heart Disease in Childhood, Channing Frothingham, M.D., Boston, Mass.

4:30-5:30 P. M.—Nurses and their guests are cordially invited to a tea by Mrs. Ann How, Superintendent of Nurses, Eastern Maine General Hospital, at the Thaxter House, 430 State Street.

7:30 P. M.—Social meeting and Banquet, Penobscot Valley Country Club.

SOCIETY MEETINGS

NEW ENGLAND STATE MEDICAL SOCIETIES

The annual meetings of the New England State Medical Societies are scheduled as follows:

Vermont State Medical Society—St. Johnsbury, Oct. 15-16, 1925.

BOOK REVIEWS

A Synopsis of Surgery. By ERNEST W. HAY GROVES. Seventh Edition. William Wood and Company, New York. 1925. $5.00.

This compact and concise synopsis of surgical disorders will find its chief, if not only function, as a memory aid in the preparation for the type of examination which we are glad to see being discarded by many of the better medical schools. But while educators may question the desirability and durability of the kind of medical knowledge which is derived through the perusal of synoptic texts and quiz compends, it is probable that a certain type of mind will always find them of invaluable assistance in qualifying for a degree in medicine or a state board certificate. The author has admirably executed his purpose in presenting salient facts with an astonishing degree of completedness and brevity.

Surgical Clinics of North America. (Issued serially, one number every other month.) Volume V, Number I (New York Number—February 1925). 294 pages with 142 illustrations. Per clinic year (February 1925 to December 1925) Paper, $12.00; Cloth, $16.00 net. Philadelphia and London: W. B. Saunders Company.

To those who are themselves operators, there is considerable fascination in the detailed account of operations done by other surgeons. Special articles written upon a topic are likely to be overloaded with repetition of facts already known, whereas the discussion of a given case carried on in the few minutes preceding the operation is fairly sure to deal only with features about which there may exist differences of opinion.

It is this vitality of discussion which makes so interesting the present issue of the Surgical Clinics of North America.

Among the subjects treated are: Goiter, Dr. Eugene Pool and associates; Peptic Ulcer, Dr. A. A. Berg et al; Urological operations, Dr. Edwin Beer; Sarcoma of the Long Bones, Dr. William B. Coley; Various surgical problems, Dr. Charles L. Gibson; Cholecystitis, Dr. Frederic W. Bancroft and associates; Urinary Incontinence in Women, Dr. H. Dawson Furniss; A Survey of Roentgen Therapy, Dr. Francis Carter Wood; Operations under Paravertebral Anesthesia, Dr. Oswald S. Lowsley. Drs. Elsberg, Moorhead, Green, and Lilienthal also have sections on various topics.

Among these subjects, it is difficult to select particular ones for mention. The discussions of goiter and peptic ulcer, and the most excellent summary of X-ray therapy, will perhaps have the widest appeal. The entire volume is interesting and valuable.